

# PUBLIC WORKS

**Nov.**  
**1952**

**CITY, COUNTY AND STATE**

**Streamlining a Public  
Works Organization**

**Pneumatic Conveyors  
Handle Bulk Chemicals**

**City-Owned Equipment  
Reduces Street Costs**

**Conservation and the  
Public Works Engineer**

**City Plant Treats  
Industrial Wastes**

**How to Correct Slick  
Spots on Pavements**

**New Filter Design Has  
Special Features**



**Howard R. Green, Consulting Engineer of Cedar Rapids, Iowa, is shown here against the background of a recent job. More on page 24**

ONE FINGER  
CAN DO ANY  
STEERING JOB  
ANY TIME  
ANY PLACE.



# GALION LEADS-

## BOOSTER STEERING

### -OTHERS FOLLOW

#### LARGE FRONT TIRES

GALION also was the first to include large front tires (same size as on rear drive wheels) as standard equipment on their three largest size motor graders. This benefits GALION users by giving . . . greater flotation on soft ground . . . greater resistance against side drift . . . and higher axle clearance.

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For seven years, GALION has led competition by regularly providing a Hydraulic Booster in combination with manual steering. This feature results in . . . speed-up of operations . . . easier and more flexible maneuvering . . . more alert operators (less fatigue) . . . all of which means more and better work accomplished.

When you buy GALION — you get the BEST — you get the MOST for your money! Write today for literature.

\*Three largest sizes.



# GALION

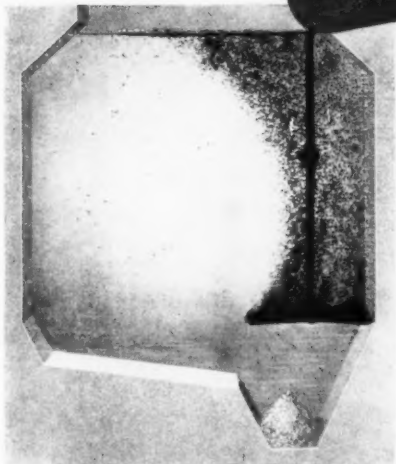
## MOTOR GRADERS · ROLLERS

THE GALION IRON WORKS & MFG. CO., General and Export Offices, Galion, Ohio, U.S.A.

Cable address: GALIONIRON, Galion, Ohio

CHICAGO  
SEWAGE  
EQUIPMENT

## Chicago AER-DEGRITTER



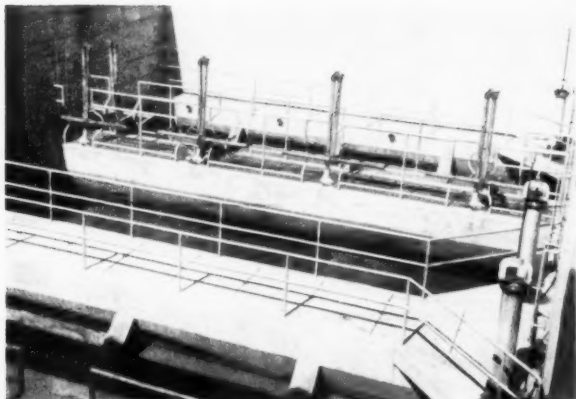
The only method of removing grit and sand from sewage without mechanical equipment is provided by the Chicago Aer-Degritter. The velocity of flow is controlled by air introduced through Chicago Swing Diffusers and Precision Diffuser Tubes. All sand of 0.2 mm. (65 mesh) and larger is washed and deposited in the bottom of the tank.

Less than 10% volatile matter and only a negligible trace of putrescible organics remains in the grit removed. Aer-Degritters may be installed ahead of all mechanical equipment because coarse sewage material will not interfere with the operation of the Aer-Degritter or affect the hydraulic design of the plant.

Here are the basic features of the Chicago Aer-Degritter.

- MAXIMUM REMOVAL • CLEAN GRIT
- NO MECHANISM • LOW COST
- SIMPLE STRUCTURE • AIR CONTROLLED
- VELOCITIES INDEPENDENT OF FLOW

**52**  
INSTALLED  
IN  
TWO YEARS



COLUMBUS OHIO SEWAGE TREATMENT PLANT  
Design Flow 160 M.G.D.  
PAUL A. UHLMANN & ASSOCIATES  
Consulting Engineers

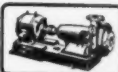


BELLAIRE, TEXAS SEWAGE TREATMENT PLANT  
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HILTON & COULSON  
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## CHICAGO PUMP COMPANY SEWAGE EQUIPMENT DIVISION

622 DIVERSEY PARKWAY

Flush Kleen, Scrub-Peller, Plunger.  
Horizontal and Vertical Non-Clogs  
Water Seal Pumping Units, Samplers.



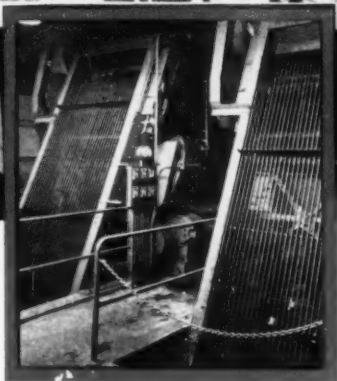
CHICAGO 14, ILLINOIS

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Mechanical Aerators, Combination  
Aerator-Clarifiers, Comminutors.



Jeffrey FLOCTROLS for the mixing basins and Jeffrey Sludge Collectors for the settling basins — combine to make the plant above one of the southwest's most efficient and largest (30 million gallons daily).

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The 1952 volume of Public Works will be available on microfilm through University Microfilm, 313 N. First St., Ann Arbor, Mich.

THE ENGINEERING AUTHORITY  
 IN THE CITY-COUNTY-STATE FIELD

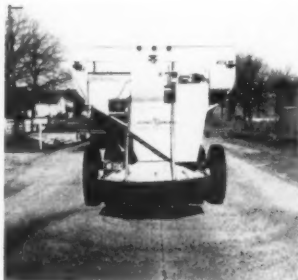
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when snow comes—

For  
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control next summer a  
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## 2 new **MONTHLY FEATURES**

Starting in  
December **PUBLIC WORKS**

### 1 "People, Ideas and Places"

by Dr. Geo. E. Symons



**T**HE list of 'Doc' Symons' activities and honors exceeds the limits of this space. It includes teacher, researcher, licensed engineer, operator, chemist, lecturer, columnist, editor, and consultant.

He is a member of many chemical and engineering societies, was formerly chief engineer of, and is still consultant to, the Buffalo Sewer Authority. He was editor of the 9th edition of "Standard Methods for the Examination of Water and Sewage," editorial coordinator of the 2nd edition of the A.W.W.A. "Manual of Water Quality and Treatment," and formerly a columnist and managing editor of *Water and Sewage Works* magazine.

### 2 "Up Front for Adequate Roads"

by Leo J. Ritter, Jr.



**P**ROF. RITTER is associate professor of transportation engineering at New York University, conducting courses in highway engineering and soil mechanics.

Recently he was Fulbright award lecturer on these subjects at the University of the Philippines. Earlier he held faculty posts at Mississippi State College, University of Florida, and A. & M. College of Texas. He also serves on the publications committee, highway division, of A. S. C. E.; is a member of A. R. B. A. technical committees on Advancement of Highway Engineering and Compaction of Soils; and of the Highway Research Board committee on Compaction of Subgrades and Embankments.

With these added features appearing every month, **PUBLIC WORKS** again goes forward in giving its readers and advertisers a still more modern and authoritative magazine, packed with helpful editorial content to enable these readers to do an increasingly better job for their communities.

LOOK FOR MORE OF THESE ANNOUNCEMENTS SOON

# **PUBLIC WORKS**

*Headquarters for Engineering Information*

Thousands use our Readers' Service card to keep up to date . . . do you?

## THE EDITOR'S POINT OF VIEW



### Good Work Needs Good Engineers, Inspectors and Contractors

WHEN a new highway, a new sewage treatment plant or a new pipe line has been built, there it is. It has to last, for the money has been spent. No more is available for the purpose. Concrete and steel cannot be taken up, remodeled to meet our needs and replaced.

This means that the job has to be right in the first place. Good engineering design, based on adequate surveys and studies, is the first requisite. For construction, a good contractor, with know-how and with the proper equipment is necessary. To act as liaison between the engineer and the contractor, good inspection service is necessary. In too many cases, this has been the weak link, influenced by the shadow of the cost sheet, or perhaps by the scarcity of engineers.

It seems to us that the principal inspector on a job should be equal in ability to the contractor's superintendent; and he ought to be paid as much, figuring on an annual basis. A man of this type, with the authority for the give and take so necessary on any job, could do much to insure that teamwork which not only expedites the progress of the work, but produces a better job at a lower cost.

### Have You Revised Your Specifications Lately?

DURING the past five or six years there have been many developments in equipment and materials. Have your specifications been revised to take advantage of the improved, more efficient and perhaps lower cost equipment and materials? Or are you still using ante-bellum or end-of-the-war model specifications? It can make a lot of difference.

Labor-saving machinery has become extraordinarily important with the increase in cost of labor and its scarcity. Labor-saving is equally important in new construction and in operation and maintenance. Automatic controls and equipment that can be run with one man where two or three were previously required may save thousands of dollars in annual operating costs. The same is true in maintenance of streets and highways. In construction, modern equipment will not only save money, but it will speed up the work

which, in some types of construction—as in street repair and street openings—is essential in the light of present traffic conditions.

What we have said applies to the entire field of public works, whether design, construction or operation; and whether the responsible man is a city, county or state engineer, a consulting engineer, or a water works superintendent. He needs information on 1952 model equipment and materials and he needs 1952 model specifications.

### Now and Then a Little in the Lighter Vein

THE management of public works is a serious business and those engaged in it are usually serious and responsible citizens. Their work cannot be taken too lightly; the life and welfare of too many thousands may be involved.

With a full recognition of these facts, we also want to recognize that perhaps "a little nonsense now and then is relished by the best of men"; so, if you find occasion for a little laughter mingled with the responsible—and perhaps occasionally the pontifical—in our pages, it is because this makes for a better balance and a truer perspective among the difficulties that dog us all. A man need take himself no less seriously for an occasional pause to smile not at but with his fellow men. We hope to contribute, in the future, a bit toward that end; not too much, but enough to leaven the lump of wholehearted devotion to duty which distinguishes the work and attitudes of the frequently unsung men of public works.

### Directions for Writing Articles for Public Works

WE get quite a good many requests for information on how we want articles written. There is, of course, no single formula, for each job to be described will vary. But many years ago, Rudyard Kipling summed up the job as follows:

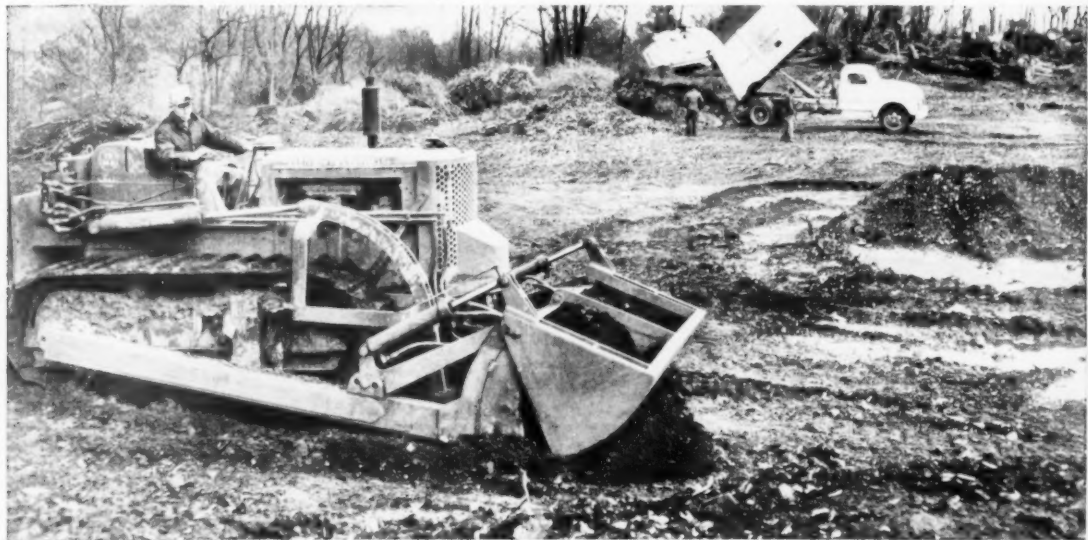
I keep six honest serving men;  
They taught me all I know;  
Their names are What? and Why? and When?  
And How? and Where? and Who?

We don't expect all of our writers to be Kiplings, but if they follow in his footsteps sufficiently to answer all of the above questions, they will have gone a long way. Thanks a lot.

# Griffin's Garbage



**ONE-MAN SANITATION SQUAD** spreads a pile of refuse before crushing it flat and burying it. The versatile Bull-clam is specially designed to do the whole job. Note fresh-graded area in background, covering yesterday's garbage.

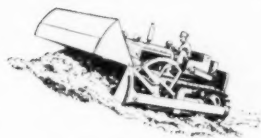


**COVER-UP** is fast, easy, efficient with the International Crawler-Drott Bulleclam unit.

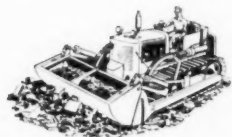
# Goes Underground

**"Now we get compliments  
instead of complaints"**

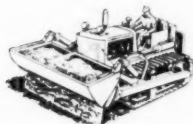
**says Sanitation Department Head**



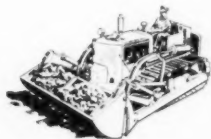
1. Prepares the site



2. Crushes and compacts refuse



3. Transports and spreads earth cover



4. Grades and levels finished area

Fifty tons of refuse a day go into a sanitary fill at Griffin, Georgia.

"We used to have a smelly open dump, constantly burning and full of rats," says sanitation department superintendent, Joseph Williams.

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**SEE YOU  
AT THE POLLS!**





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**Stops corrosion cold!** Bermico is unaffected by acids and alkalis normally found in corrosive soil. It will not scale or tuberculate—and its smooth bore delivers a high flow capacity.

**Specify Bermico** — the cellulose, pitch-impregnated pipe for outdoor, underground, non-pressure use. For information write Dept. EB-11, Boston.

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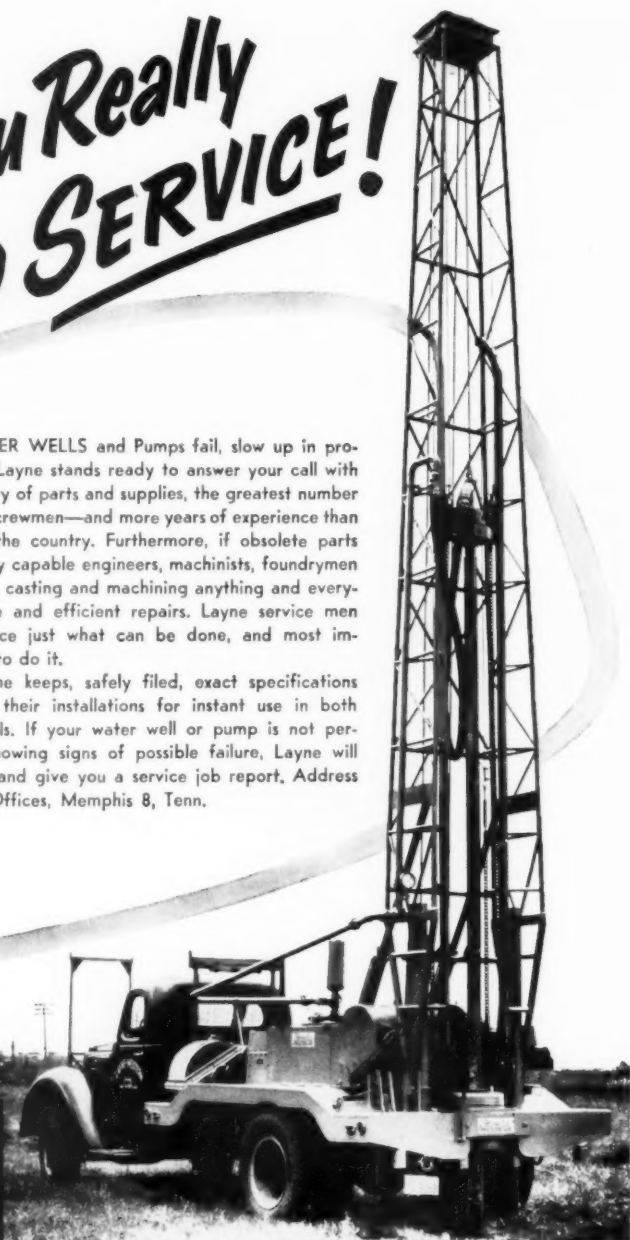


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(\*for all makes of pumps)



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"It has given very good satisfaction plus good dealer service."

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"It really digs in and works."

The D4 is power-packed and brawny. But fully as important, it is economical. Its 4-cylinder engine,

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The "Caterpillar" D4 is built for a long, useful life in the toughest going. It will remain your most dependable friend if you insist on genuine "Caterpillar" parts. See your "Caterpillar" Dealer and put the D4 on your payroll now.

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS

## CATERPILLAR

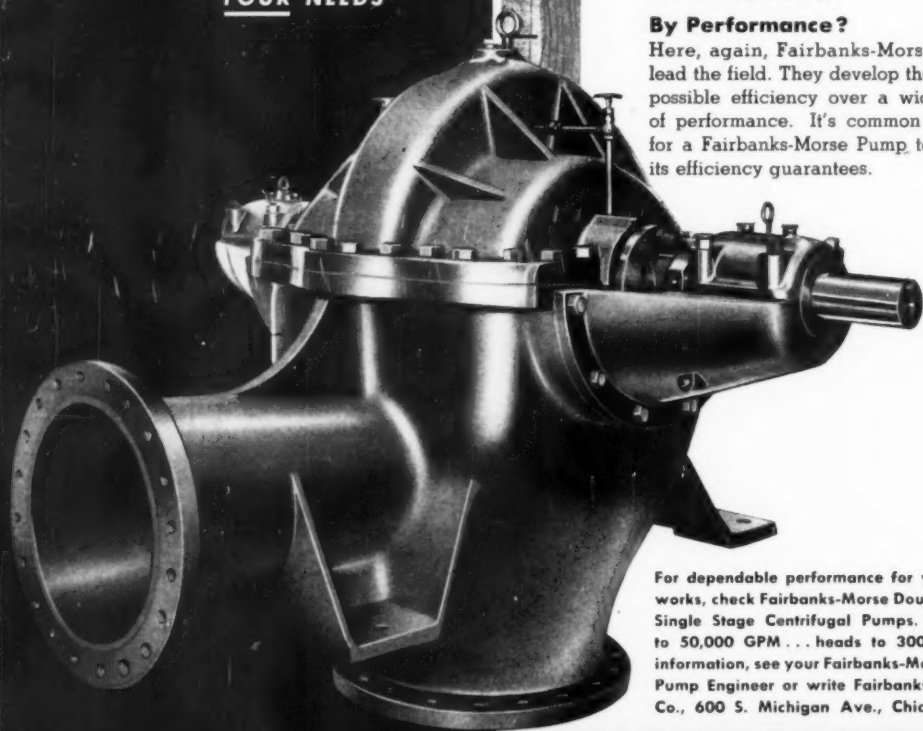
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TRACTORS • MOTOR GRADERS  
EARTHMOVING EQUIPMENT**

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Fairbanks-Morse Pumps are noted for their minimum maintenance requirements. And, when servicing is needed, Fairbanks-Morse accessibility makes it fast and easy. For example, the entire rotating impeller element can be removed without disturbing driver, suction or discharge piping.

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WATER SERVICE EQUIPMENT • RAIL CARS • FARM MACHINERY • MAGNETOS



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Why?

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Remember: One pound of Banox per 100 pounds of salt is all that's needed. For complete information about Banox-salt mixtures, write for your free copy of "Stop, Look and Save with BANOX".

**BANOX**

**calgon, inc.**

HAGAN BUILDING  
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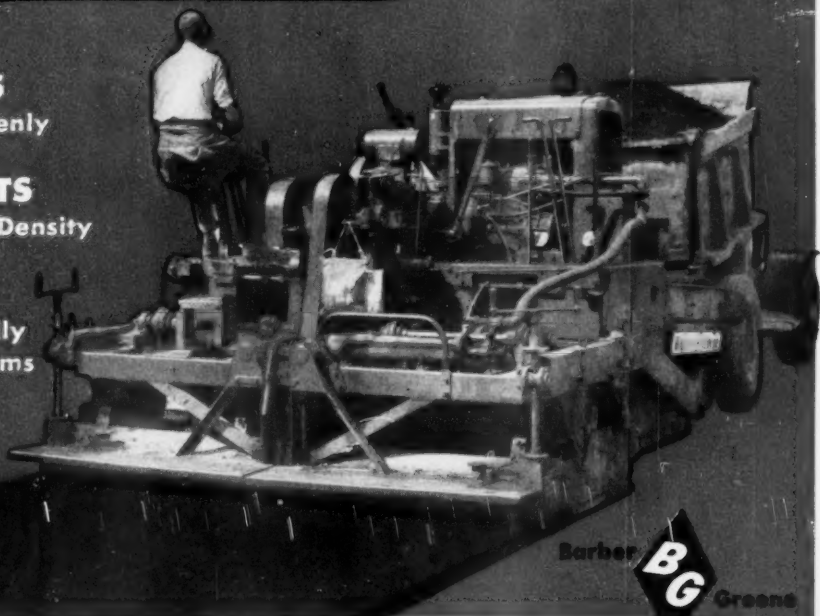
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Material Evenly

**COMPACTS**  
to Uniform Density

**LEVELS**  
Automatically  
Without Forms



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With this superbly designed machine, you are able to lay every type of mix—hot or cold—from clay stabilized gravel to high-type sheet asphalt. Whatever type mat you are laying, the B-G Finisher automatically measures the correct amount of compacted material—then simultaneously tamps, levels and strikes off to produce a ripple-free surface that is maintained under rolling and

traffic. Because the material is compacted while it is being laid, you are assured of a surface of uniform density. And with the B-G leveling principle you compensate even for abrupt changes in the subgrade.

It will pay you to investigate this unequalled, universally preferred method of paving streets, highways, runways, parking lots, tennis courts and similar jobs. You will learn, for example, how the B-G Finisher saves truck time, minimizes rolling and reduces the size of crew. Investigate today!

# Barber-Greene

Aurora, Illinois, U. S. A.



It's a fact... our handy Readers' Service card is the way to get new catalogs.

## FACTS PROVE ACE SYSTEM 100% EFFECTIVE

1

Ace saves you from 60 to 80% on Sewer and Water Main Cleaning Costs!

Ace provides mobilized service anywhere, anytime!

2

3 The Ace-system assures you maximum pipe efficiency!

WRITE, WIRE, CALL COLLECT FOR FREE ESTIMATES — NO OBLIGATION

Ace restores water pipe pressure and capacity up to 95% of the original. Foreign material is removed quickly from water mains. Firefighting operations improve and lower underwriters fire insurance rates are obtained. Yes, the Ace-system has the facts to show you dollar savings, premium efficiency and maximum service —when you need it!

Proper sanitation comes with proper sewer cleaning. Ace-system's modern equipment, coupled with vast experience and technical 'know-how' makes sewer cleaning effective at an amazingly small cost. Ask to see our 21-minute sound movie of the Kansas City flood. It shows the Ace-system in operation. No cost or obligation.

Write Today for Free Illustrated Literature!

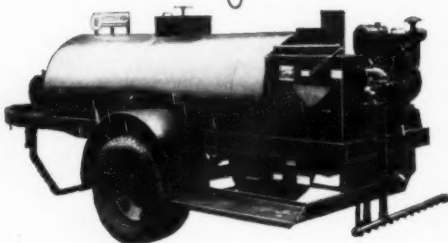
# ACE

**PIPE CLEANING CONTRACTORS, INC.**  
Sewer & Water Pipe Specialists  
Home Office  
2003 Indiana Kansas City, Mo.  
Phone Chestnut 2891  
OFFICES IN PRINCIPAL CITIES

## There's no substitute for road maintenance efficiency



3 UNITS IN ONE



LITTLEFORD

## 101 UTILITY SPRAY TANK

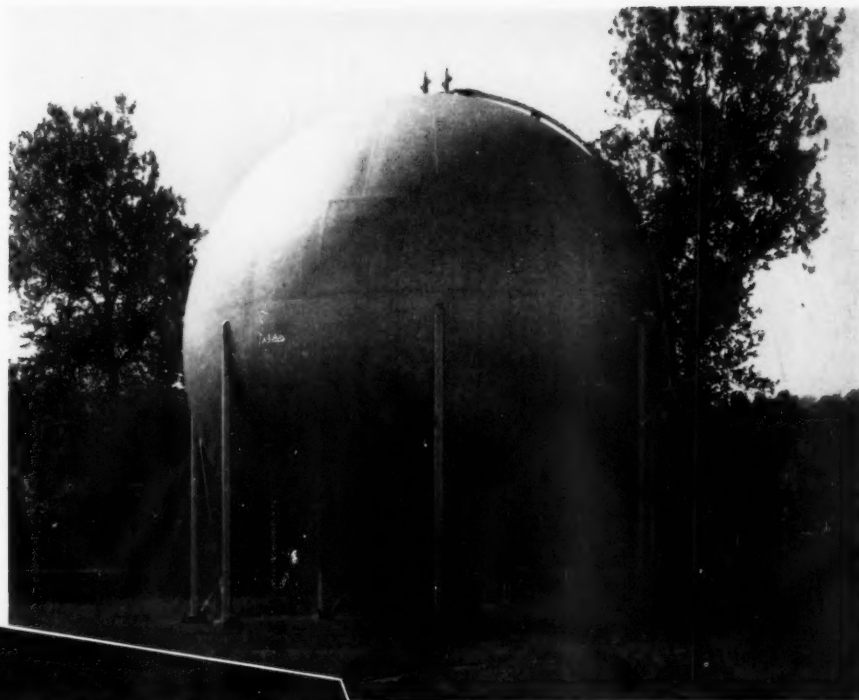
Maintaining our road system is a costly job these days, that is why so many Contractors and Highway Depts. look to the Model 101 to do the work. This 101 is the unit designed to give value received; it's a combination of three units in one.

It has a spray bar for small application jobs, a hand spray for patch work and a pouring pot outlet for crack filling and patch work. Where is there a unit with more utility — more modern efficiency? Not only does this 101 save operating dollars, but its long life saves the maintenance dollar year after year. If you want the best for your money, you'll want the Littleford Model 101 Utility Spray Tank. Write for Bulletin 5



# LITTLEFORD

LITTLEFORD BROS., INC.  
452 E. Pearl St., Cincinnati 2, Ohio



## HORTONSPHERE

### most efficient design for the storage of digester gas

Akron, Ohio's sewage disposal plant is one of many utilizing digester gas for fuel. More and more sewage disposal plants throughout the country are finding that digester gas, previously a waste product, can be utilized for heat or to generate power and light. Processing and storing this gas has become an important dollars and cents operation.

One of the biggest problems in the efficient utilization of gas is storing a reserve to meet peak loads. The Akron, Ohio plant finds that the most satisfactory solution to this problem is to use a Hortonsphere. Why? First—and perhaps foremost—you can count on your supply. Since the digester gas in a Hortonsphere is stored under pressure, it will flow through the main at a high rate when needed. Gas is stored during periods of maximum production for use during periods when

gas production is low. The Hortonsphere acts as a cushion between supply and demand.

The Hortonsphere costs less to paint since it has less surface area per cu. ft. of capacity . . . and needs minimum ground space for a given amount of storage. The shape of the Hortonsphere is appealing to the eye and blends well with plant architectural design.

Hortonspheres for gas storage are built in capacities up to 80 ft. in diameter for working pressure from 20 to 100 lbs. per sq. in. Write our nearest office for more information or quotations on this proven method of increasing plant efficiency. There is no obligation.

*Above: 53-ft. 6-in. diam. Hortonsphere used to store sewage digester gas at 29.9 lbs. per sq. in. pressure at Akron, Ohio.*

## HORTON

WELDED STEEL  
STORAGE TANKS

## CHICAGO BRIDGE & IRON COMPANY

Plants in Birmingham, Chicago, Salt Lake City, and Greenville, Pa.

Atlanta 3 ..... 2123 Healey Bldg.  
Birmingham 1 ..... 1532 North Fifth St.  
Chicago 4 ..... 2115 McCormick Bldg.  
Boston 10 ..... 1038-201 Devonshire St.  
Cleveland 14 ..... 2221 Guildhall Bldg.  
Detroit 26 ..... 1536 Lafayette Bldg.  
Houston 2 ..... C & I Life Bldg.

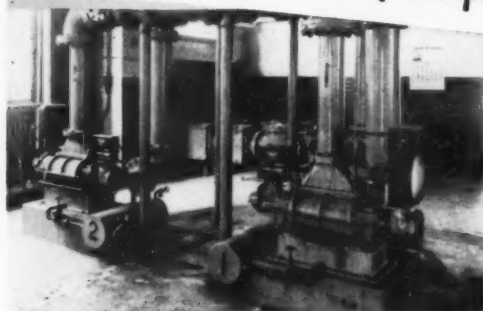
Los Angeles 17 ..... 1508 General Petroleum Bldg.  
New York 6 ..... 3316-165 Broadway Bldg.  
Philadelphia 3 ..... 1648-1700 Walnut St. Bldg.  
San Francisco 4 ..... 1535-200 Bush St.  
Seattle 1 ..... 1339 Henry Bldg.  
Tulsa 3 ..... 1641 Hunt Bldg.  
Washington 6, D. C. .... 1120 Cafritz Bldg.

Need more facts about advertised products? Mail your Readers' Service card now.



## MEASURE THESE VALUES WHEN YOU BUY METERS

*Accuracy·Capacity·Compactness*



Part of an installation of nine R-C Positive Displacement Meters in large chemical plant. Capacities from 3,000 cfh to 130,000 cfh.

Industrial buyers rate R-C Positive Displacement Meters "tops" in these basic essentials.

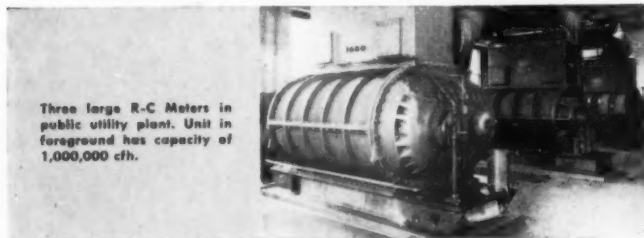
**Accuracy**—Not affected by pressure, wide variations in loads or other variables. Simple design, with no vanes, valves or small parts, results in maintained accuracy over long years of operation.

**Capacity**—from 4,000 cfh to 1,000,000 cfh in one unit, to meet practically any industrial metering requirements. Ample ability to absorb overloads.

**Compactness**—foot for foot of capacity, R-C Meters are the smallest made for industrial use. Can be "tucked away" in relatively small space without loss of valuable production area.

These values have long been proved by large and small industrial plants and public utilities. More R-C Meters are used by gas producing plants, for their own manufacturing and for commercial customers, than any other make. For details on sizes and construction, ask for Bulletin 40-B-14.

**ROOTS-CONNSVILLE BLOWER DIVISION**  
524 Oregon Avenue, Connersville, Indiana



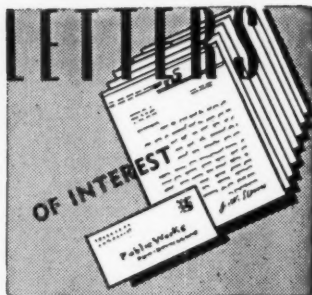
Three large R-C Meters in public utility plant. Unit in foreground has capacity of 1,000,000 cfh.

**ROOTS-CONNSVILLE BLOWER**

A DIVISION OF DRESSER INDUSTRIES, INC.



Get full details of this month's new products... mail your Readers' Service card today.



### WELCOME BACK

At present I am sanitary engineer for 8th Army with headquarters in Seoul. There is much to do in Korea and much need for sanitary engineering skills. Ray Karpen replaced Stanley Weidenkopf as sanitary engineer for Fecom the latter part of last February and has done a fine job. I am due to leave here tonight (Sept. 30) to begin my rotation home. I should be separated shortly thereafter, and I am looking forward to seeing you.

Norman G. Winder,  
Cap't., MSC,  
APO. Postmaster,  
San Francisco

### INSECT CONTROL

Thanks sincerely for the beautiful job PUBLIC WORKS did on the tear-sheet layouts of my article. I am getting enough copies of this made so that requests can be filled for reprints; and if you need any let me know.

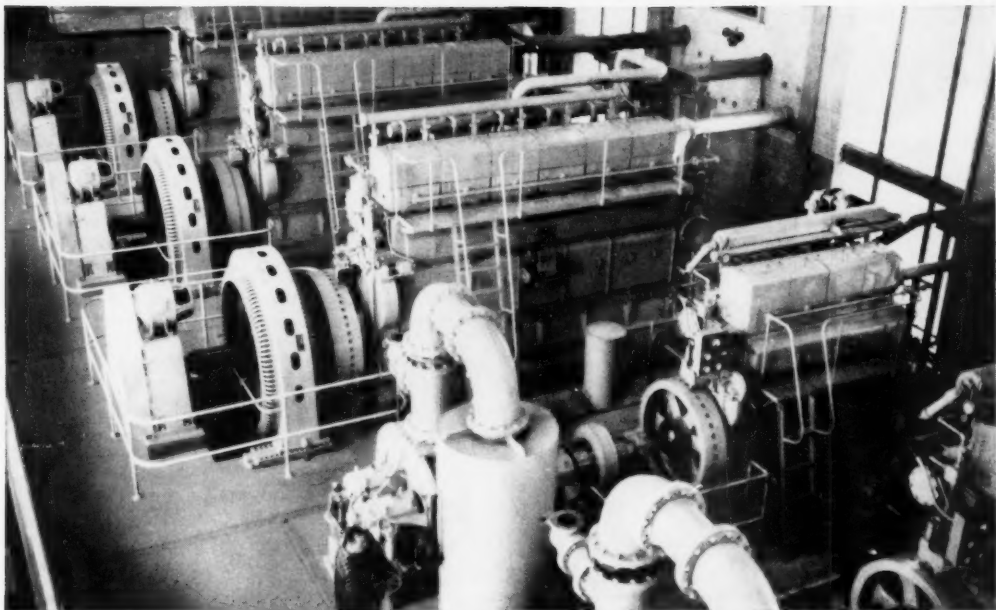
David G. Hall,  
Acting in Charge,  
Division of Information,  
Bureau of Entomology,  
Washington 25, D. C.

**ED. NOTE:** This refers to the excellent article by Mr. Hall, on *Municipal Insect Control*, which appeared in our August issue. It is not economical for us to make small runs of reprints. Those who desire copies of the article should write Mr. Hall at the above address.

### BOOKS IN BRIEF

#### APPLIED HYDRAULICS

This is the kind of book that few engineers engaged in municipal engineering should be without. It



## How Worthington Engines helped Boston improve its waterfront sanitation

Thanks to Boston's new Nut Island Sewage Treatment Plant—one of the most modern and efficient in the country—95 million gallons of raw sewage a day will no longer discharge into Quincy Bay. The plant is representative of the fine job being done by Massachusetts' Metropolitan District Commission in keeping clean the harbors and waterfront in the Boston area.

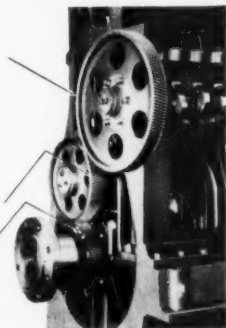
Driving the large blowers used for aeration as well as the generators that supply the plant's electric power are four large Worthington dual fuel engines and one gas engine, totaling 2,916 hp. The dual fuel engines are designed to operate as either gas Diesels utilizing the sewage gas generated in the treatment process, or oil Diesels. Should the gas supply fail in an emergency, the engines will automatically switch to the oil fuel and continue to operate. Four of the plant's main sewage pumps are of Worthington mixflo type, each designed to handle 83 million gallons per day.

Find out how modern Worthington engines—dual fuel, gas or Diesel—can solve your problem. Write, stating requirements, to Worthington Corporation, Engine Division, Buffalo, N. Y.

**Main camshaft gear.** Slots in gear provide single adjustment for retarding or advancing injection timing of all cylinders simultaneously. Final gear adjustment secured with castellated locknuts wired after final tightening.

**Free floating idler gear.**

**Split gear keyed on crankshaft.** Permanent adjustment for perfect alignment with idler gear is easily accomplished.



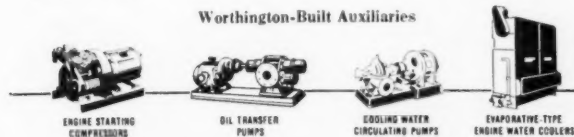
### WORTHINGTON HELICAL STEEL GEAR TRAIN

used on these Worthington dual fuel engines . . .

1. Provides accurate and positive control of engine timing.
2. Is located at flywheel end of engine for smooth gear operation as power impulses are absorbed by the flywheel.
3. Uses controlled automatic oil jet lubrication that eliminates wear.
4. Assures correct engine timing . . . keeps engine running smoothly . . . results in best fuel consumption and lowers engine maintenance.

E.2.13

### Worthington-Built Auxiliaries



**Economical Continuous Power**—Diesel Engines, 150 to 2,100 hp . . . Gas Engines, 190 to 2,100 hp . . . Dual Fuel Engines, 150 to 2,100 hp.

Thousands use our Readers' Service card to keep up to date . . . do you?





# CLEVELAND

*Pioneer of the Modern Trencher*



Right on grade on a rush job.



Smooth, clean trench—on schedule.



Truck loading came in handy here.



More than a quarter century of efficient performance in all types of trenching work has earned for CLEVELANDS their reputation for producing *more trench in more places at less cost.*

## LOOK AT THESE FEATURES

- Wide variety of speed and power combinations provides the right combination for every job.
- Compact, maneuverable—fits more jobs in congested or open areas.
- Maximum operator efficiency and visibility—correct grouping of easy acting controls.
- Safe, fast, trailer mobility—less waste-time between jobs.
- Proved design and materials—less weight—more work—longer life.
- Unit type construction—simplifies servicing.

For complete information on CLEVELAND TRENCHERS see your local distributor or write for Bulletin S-111.

**THE CLEVELAND TRENCHER CO.**  
20100 ST. CLAIR AVENUE • CLEVELAND 17, OHIO

It's a fact... our handy Readers' Service card is the way to get new catalogs.

covers the "water front." And more than that, too: There are detailed data on hydrology, water supply, sewerage, water power and hydraulic structures. Among the subjects covered are gravity dams (24 pages); arch dams (40 pages); buttress dams (62 pages); earth dams (58 pages); spillways; crest gates, outlet works and conduits; hydroelectric plants and hydraulic machinery. There are 30 pages on water hammer. Water supplies and their treatment cover 158 pages; sewerage and sewage treatment 109 pages. Hydraulic models and hydraulic formulas are also presented. In all, there are 1248 pages. The editor-in-chief is Calvin V. Davis, long outstanding in the hydraulics field. McGraw-Hill Book Co., 330 West 42nd St., New York 36, N. Y. \$15.

## CIVIL DEFENSE DICTIONARY

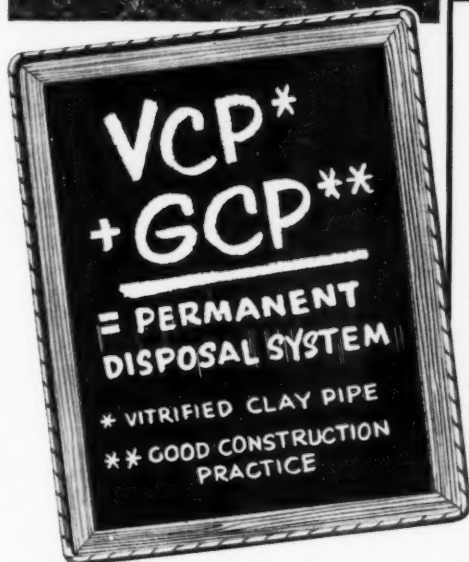
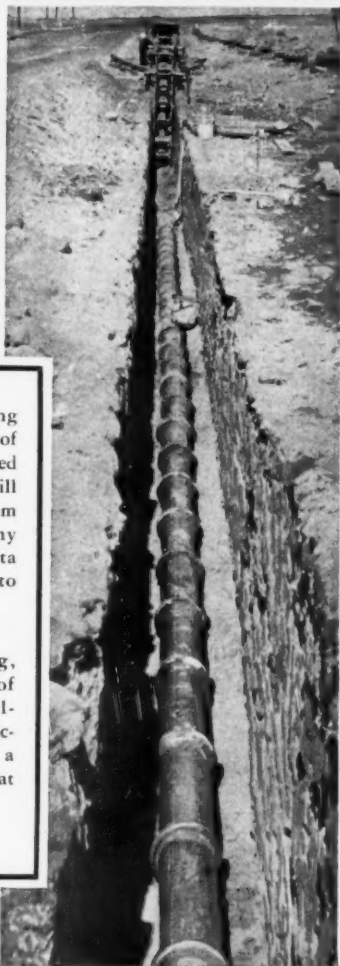
A handy book that should be of great value to civil defense organizations. The material is arranged alphabetically, with a group index which greatly facilitates reference. While the book is an English one, it applies exceedingly well to conditions in this country. 160 pages; 16 illustrations. Edited by Carlton Wallace. Jordan & Co., Ltd., 116 Chancery Lane, London WC 2. No price is given.

## WATER WORKS DATA BOOK

This is a fine and useful handbook "for practicing engineers and those who work with water conditioning problems." There are more than 100 pages of useful water works data, covering nearly all phases of purification. We do not know if this book is meant for wide free distribution, but it is well worth writing to find out. Address Permutit Co., 330 West 42nd St., New York 36, N. Y.

## WATER POLLUTION CONTROL

This is a 16-page picture booklet in color, modeled after the strips that appear in so many daily newspapers, which is intended to alert citizens and young people to the importance of water pollution control. These are being distributed by Hall Associates, 17 East 42nd St., New York 17, N. Y., at very low-cost charges.

**CLAY PIPE - ESSENTIAL \* ECONOMICAL \* EVERLASTING**

Two-level trenching speeds installation of 78,000 ft. of Vitrified Clay Pipe which will carry waste water from Union Oil Company refineries near Santa Maria, California, to the Pacific Ocean.

Straight trenching, careful alignment of Clay Pipe, and all-around good construction practices assure a trouble-free system that will never wear out.

**NATIONAL CLAY PIPE MANUFACTURERS, INC.**

311 High Long Bldg., 5 E. Long St., Columbus 15, Ohio  
 705 Ninth & Hill Bldg., Los Angeles 15, Calif.  
 100 N. LaSalle St., Rm. 2100, Chicago 2, Ill.  
 206 Connally Bldg., Atlanta 3, Ga.

**WHEREVER RELIABLE PERFORMANCE-PROVED PIPE IS NEEDED, SPECIFICATIONS CALL FOR VITRIFIED CLAY**

Bakersfield, Calif. (Municipal Expansion) .....	313,000 ft.
Rantoul, Ill. (Chanute Field) .....	158,000 ft.
Morrisville, Pa. (New Steel Defense Plant) .....	300,000 ft.
Panama City, Fla. (Municipal Expansion) .....	450,000 ft.
Tucson, Ariz. (Air Force Base) .....	440,000 ft.
Rapid City, S. D. (Air Force Base) .....	54,000 ft.
Limestone, Maine (Air Force Base) .....	65,000 ft.
Orlando, Fla. (Air Force Base) .....	74,000 ft.



C-1052-2

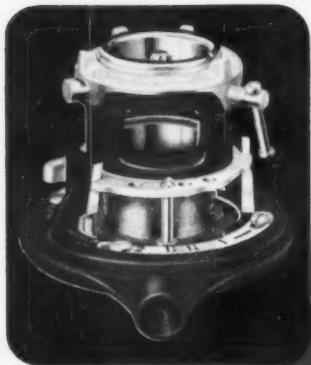
Now's the time to mail this month's Readers' Service card.



For Extra Fast Easy Smooth  
Pipe Threading Choose

# RIGID

## Work-Saver Die Stocks

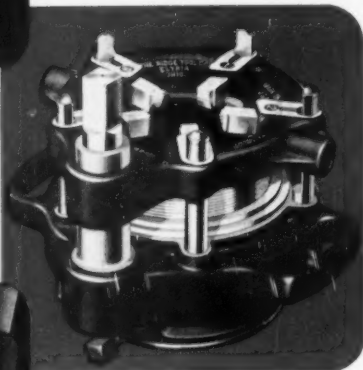


### JAM-PROOF 65R

Perfect threads on 1" to 2" pipe with 1 set of 4 high-speed steel dies—sets to pipe size in 10 seconds. Lead screw on barrel won't jam on workholder—drive plate automatically kicks out driving pawl. Self-centering workholder sets instantly!

### 4P GEARED THREADER

For 2½" to 4" pipe. Balanced loop handles—easy to lift 4P where you want it. Mistake-proof workholder sets to size before put on pipe—1 set screw. Safe enclosed gear. Practically no upkeep. Special 4P for conduit.



### 00R RATCHET THREADER

For ¼" to 2" pipe. Heads snap into ratchet ring from either side, won't fall out. Precision-cut alloy dies reverse for close-to-wall threads. 00R and 0R, ¼" to 1"; 111R and 11R, ¼" to 1½"; 12R, ¼" to 2". Conduit dies, too.

### EXTRA VALUE

RIGID's are famous for efficient design, smooth performance, rugged durability. Every die stock factory tested. For top value for your money, buy RIGID threaders from your Supply House.



THE RIDGE TOOL COMPANY • ELYRIA, OHIO



Need more facts about advertised products? Mail your Readers' Service card now.



### LEADERS IN PUBLIC WORKS

Howard R. Green, consulting engineer of Cedar Rapids, Iowa, is now in his 40th year in private practice. He is shown on the front cover of this issue against the background of a new 10-acre industrial plant which his company designed and built for the Cherry Burrell Corporation. His practice is about evenly divided now between municipal and industrial work, he tells us. The ordinary staff of the Howard R. Green Co. numbers about 35, but in World War II days, during which he designed and supervised the building of eight military installations, it got up above the 400 mark. Partners in the firm are C. P. Lewellen, head of design, and Charles P. Mullinex, head of sanitary engineering.

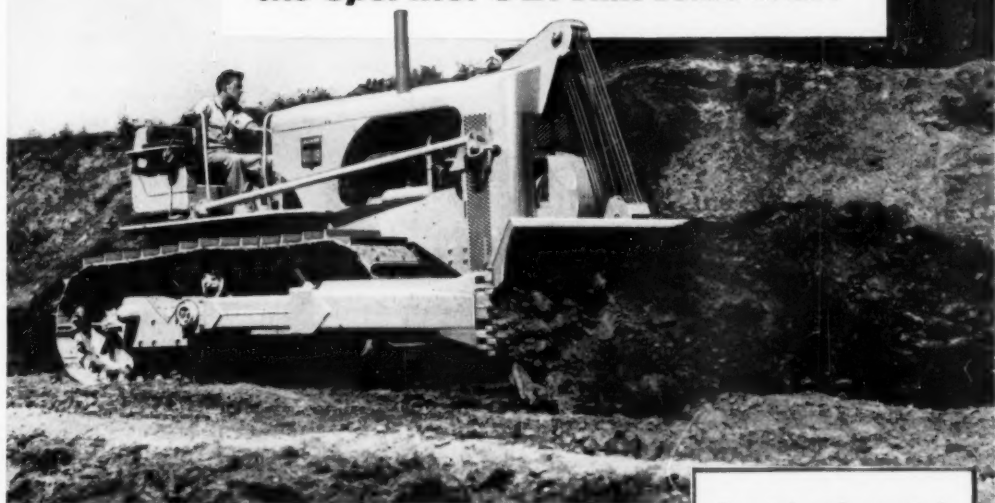
Howard Green has done sound engineering, but he has also done pioneering work. The Cedar Rapids sewage treatment plant, built as "Docket No. 1, Iowa" under PWA, included the largest rotary distributors constructed in this country up to that time; the first mechanical coagulation; and the first vacuum filter and centrifuge used in Iowa for sludge dewatering. Many more of his interesting jobs are listed in a booklet we have at hand; but there is no room here to enumerate them.

Mr. Green is a member of ASCE, AWWA, Iowa Engineering Society and numerous other technical and community organizations. We congratulate him and his organization on their many fine engineering works; and we want to add the personal appreciation of the Editor of Public Works for the help and encouragement given him by Mr. Green during World War II.



# *the New* **OLIVER "OC-18"**

*the Operator's Dream come true!*



Here's a tractor that has been designed specifically to make life as easy as possible for the operator. Just check this list of "easy operating" features—it puts the "OC-18" way out in front as the tractor that gets more done . . . faster . . . every day.

1. Over-Center Clutch. The clutch bar runs across the full width of the dashboard. No need here for the operator to hunt for a single lever . . . to take his eyes off the work.

2. Air Steering is Standard Equipment. You can steer the "OC-18" with just two fingers of one hand.

3. Push Button Electric Starting. The husky starter of the "OC-18" gets the engine going . . . quick.

4. Cold Weather Starting Aid . . . standard equipment on the Oliver "OC-18" for fast, easy starting in extremely low temperatures.

5. Center-Positioned Gear Shift Lever . . . is located right where it's easiest to reach.

6. Ample Leg Room . . . no cramped legs after a hard day's work with the "OC-18".

7. Convenient Foot Parking Brakes are standard equipment on the "OC-18".

8. Comfortable, Two-Man Seat . . . plenty of room for two men in this upholstered seat.

9. Easy-Acting Friction Throttle is located at the right arm rest of the seat in the most convenient position for the operator.

You get plus performance too! A full 126 drawbar horsepower . . . greater stability . . . more track on the ground. Just note the photograph. See how the track hugs the ground almost its entire length. It means real pulling power . . . greater stability and better balance for dozing.

Try out this great new tractor for yourself. Ask your Oliver Industrial Distributor to arrange a demonstration. When you've seen the "OC-18", you'll never be satisfied with any other big tractor.

## **THE OLIVER CORPORATION**

400 West Madison Street, Chicago 6, Illinois



A complete line of industrial wheel and crawler tractors

Get full details of this month's new products . . . mail your Readers' Service card today.



The OLIVER Corporation, Industrial Division  
400 W. Madison Street  
Chicago 6, Illinois

Gentlemen:

Please send me literature on the Model "OC-18" Industrial Crawler Tractor.

Name .....

Company..... Dept. ....

Address.....

City..... State.....



## **DRAINAGE PROBLEMS** on Defense Projects handled faster with *UNIVERSAL* **MOBILE SITE-CAST EQUIPMENT**

Drainage problems won't hold up your defense project if you'll (1) rely on one of Universal's 23 "local" plants to supply you with all your pipe needs, or (2) call in Universal to make the pipe right on the job, using MOBILE pipe-making equipment.

Any Universal plant will meet your requirements for ASTM pipe, help keep your project on schedule. Contact the plant nearest you!

IF YOU'RE CONTRACTING ABROAD, you can take Universal mobile pipe-making equipment with you. Ask for details.

### **UNIVERSAL CONCRETE PIPE CO. PLANTS**

ALABAMA: Decatur, Do-ham, Florence. FLORIDA: Miami, Ocala (Florida Concrete Pipe Co.), St. Petersburg, Tallahassee, Tampa. GEORGIA: Atlanta. KENTUCKY: Louisville (Dixie Concrete Pipe Co.). MARYLAND: Baltimore (Jessups). NEW JERSEY: Kenil. NEW YORK: Binghamton, New York City, Port Washington, Rochester, Syracuse. OHIO: Columbus, Zanesville. PENNSYLVANIA: Norristown, Pittsburgh. TENNESSEE: Nashville. WEST VIRGINIA: Clarksburg, Charleston, New Martinsville, Wheeling. AFFILIATE—Concrete Pipe Co. of Ohio, Cleveland, Sandusky, Youngstown, Ohio; Erie, Penn.

### **UNIVERSAL CONCRETE PIPE CO.**

Home Office: 297 S. HIGH ST., COLUMBUS 15, OHIO

## **Low cost, pure filtered water, for small and medium size municipal water works now possible with a — SPARKLER Model SCJ self cleaning water filter**

The model SCJ filter is a diatomite slurry feed filter designed to produce the highest quality pure water at a maintenance cost much lower than usually can be attained with older type filters.

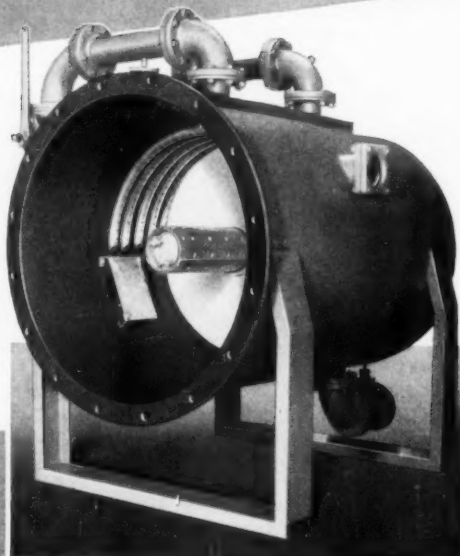
This filter can be cleaned in two to five minutes either by flushing off with the built-in jet spray or by backwashing or a combination of both. The filter media is usually a synthetic cloth such as orlon which pre-coats quickly and washes clean rapidly.

A high efficiency diatomite slurry feeder, which operates in conjunction with the SCJ Sparkler Filter, adds greatly to the length of cycle between cleanings . . . resulting in lower operating costs. Operators can be easily trained . . . no highly skilled specialized personnel required. Floor space occupied by the SCJ is relatively small for the extremely large volumes handled. Single units are available in sizes to handle up to 96,000 G.P.H. . . . or over 1,000,000 gallons per day. And . . . this is important . . . the largest unit uses less than 1000 gallons of water to clean the filter.

Write for plans and prices on your requirements.  
Personal engineering service on all installations.

**SPARKLER MANUFACTURING CO. MUNDELEIN, ILL.**

*Manufacturers of industrial filters for over a quarter of a century.*



Thousands use our Readers' Service card to keep up to date . . . do you?



IT'S DARLING'S NEW  
**B-50-B**  
Patent Pending  
 FIRE HYDRANT

*...What a difference!*

**Y**ES, what a *difference*! That's the word that's going around about the new and unique B-50-B—rated the most important advance in fire hydrant design in 50 years.

First, note that the B-50-B is *ball bearing* operated. Opening and closing takes less than half the usual wrench torque. *Smother, faster, easier* operation every time!

Next, see how the B-50-B design uses "O" ring seals. No need for a stuffing box. It's a packless, *dry-top* hydrant. And it saves plenty of time and trouble! Does away with bothersome packing gland adjustment as well as the usual lubrication and maintenance of packing. Moreover, this "O" ring arrangement not only prevents the loss of thread and bearing lubricant, but never lets a drop of water reach the operating threads. Just add up *these* advantages!

As in any Darling hydrant, all inside working parts (main valve, main valve seat, drain valves and drain valve seats) can be removed through the top of the B-50-B for easy inspection and simplified maintenance. One 15-pound wrench does the trick, regardless of trench depth.

Before you decide on *any* hydrant, get *all* the facts on the Darling B-50-B.

**Write for Bulletin No. 5007**

**DARLING VALVE & MANUFACTURING CO.**  
 Williamsport 10, Pa.

# EQUIPMENT DATA TO HELP YOUR PUBLIC WORKS PROGRAM

The engineering information in these helpful catalogs will aid you in Engineering and Public Works programs. Just circle numbers you want on the coupon or write the manufacturer direct and mention PUBLIC WORKS.

## To Restore Capacity Of Water Lines

78. Water pipe cleaning service by hydraulic methods, power driven cleaners for scale and encrustation removal, plus relining of water mains are services offered by Ace Pipe Cleaning Contractors, Inc., 2003 Indiana Ave., Kansas City, Mo. For full description of these and other pipe cleaning services get the illustrated Ace catalog. Just check the coupon.

## Spreader Jets

### For Rotary Distributors

125. Details on P.E.T. Spreader Jets for rotary distributors and the patented Spreader Jet with hinged deflectors are detailed in a new 4-page bulletin, No. 313-A, released by Pacific Flush Tank Co., 4241 Ravenswood Ave., Chicago 13, Ill. Copies available on request to the company or by checking the coupon.

## What You Should Know

### About The Centrline Process

197. The Centrline method for lining mains in place to stop leaks, prevent corrosion and increase carrying capacity is fully described in a handsome booklet issued by the Centrline Corp., 140 Cedar St., New York 6, N. Y. Many illustrations and typical case histories show the operation and economies of this process. The Tate process for lining smaller mains is also covered. Check coupon for your copy.

## 10 Reasons for Blanket Bond

### Covering Public Employees

289. As a part of their modern bonding program the National Surety Co. presents 10 reasons for having a Public Employees' Blanket Bond covering your personnel in forms offering greatest protection per premium dollar. Get Form 23163 by checking the coupon. National Surety Corp., 4 Albany St., New York, N. Y.

## Prevents Rust

### This New, Easy Way!

266. Texaco Rustproof compounds for protection of metal surfaces against rust and corrosion are applied like paint; form soft, self-sealing, waterproof films that prevent rust formation and penetrate old rust layers to stop corrosion. Applications to bridges, tanks, construction machinery and sewage plant equipment are but a few of the municipal uses. New 12-page illustrated booklet gives full details. Check coupon or write to the Texas Co., 135 E. 42nd St., New York 17, N. Y.

## What's Your Problem in

### Industrial Waste Treatment?

22. Highly useful data on industrial waste treatment processes, as applied to more than 50 different types of waste, are covered in the



B-I-F Industries "Industrial Waste Treatment Guide." Flow diagrams, installation photographs and equipment details are included in this helpful bulletin (B-I-F-4). Check coupon now for your copy, or write to B-I-F Industries, 345 Harris Ave., Providence, R. I.

## Design Data Offered

### On The Spiragester

42. The Spiragester, a unit which combines the Spiraflo Clarifier and a digestion compartment in a two-level arrangement to save space and reduce construction costs, is fully described in Bulletin 124 released by Lakeside Engineering Corp., 222 West Adams, Chicago, Ill. Design details, including capacities for 8 to 24' units are furnished together with typical plan and elevation. Check the coupon for this helpful bulletin.

## Give Full Protection

### To Treated Poles and Timbers

267. Bolt holes in treated poles and timbers used for guard rails and structures can easily be the first point of decay. Now you can assure

maximum life by using the Greenlee Bolt Hole Treater, a simple device that forces preservative into the wood cells. Bulletin 13-15 gives the details. Greenlee Bros. & Co., Rockford, Ill.

## Investigate Pneumatic Conveyors

### For Bulk Chemical Handling

184. Case histories of several municipal installations are featured in a new 24-page technical bulletin, No. 529, issued by the Dracoo Corp., Cleveland 5, Ohio. This bulletin gives complete information on the Dracoo "Airstream" Pneumatic Conveyors for handling bulk materials. Check coupon for your copy.

## Handy Catalog Covers

### All Pipe Repairs

290. A complete catalog covering repair clamps, packings and gaskets of several designs to suit all needs is offered by Smith-Blair, Inc., So. San Francisco, Calif. Directions for use show ease of application. Every water works needs a copy of this catalog for ready reference. Available by using the coupon.

## Design Data Offered

### On Rotary Distributors

269. The American Well Works, Aurora, Ill., has issued a new technical supplement, which provides detailed information on rotary distribution hydraulics and dosing siphon operation and outlines features of reaction type and positive drive distributors. This 18-page technical supplement is available by checking the coupon.

## The Stressteel Manual—

### A Prestressing Handbook

276. The Stressteel Corp., 207 East 37th St., New York 16, N. Y., producer of large diameter, high strength steel tensioning units for prestressing concrete has published a 40-page Manual including chapters on applications, design data, construction procedures, and a picture story made on a typical job. To get a copy of this excellently prepared Manual check the coupon.

## Handy Guide to Selection of

### Centrifugal Pumps

284. Centrifugal pumps for many diversified applications are included in the broad Allis-Chalmers line which is described in the new "Handy Guide to Selection of Centrifugal Pumps." Get your copy of this bulletin, No. 52C6059J, by checking coupon or write Allis-Chalmers Mfg. Co., 1189 S. 70th St., Milwaukee, Wis.

## Ready Reference Chart

### For Plastic Pipe

287. Flexible, semi-rigid and rigid high impact plastic pipes produced by Triangle Conduit & Cable Co., Inc., New Brunswick, N. J., are described in a new ready-reference chart which shows forms and sizes available, physical and chemical properties and applications, such as many uses in sewage and water plants. Be sure to investigate the use you can make of plastic pipe. Check the coupon today.

READERS' SERVICE DEPT. PUBLIC WORKS MAGAZINE 310 East 45th Street, New York 17, N. Y.

Please send me the following literature listed in the Readers' Service Dept. of your November issue.

Booklets from pages 28 to 40:

20	21	22	24	25	32	33	35	36	37	42	43	44	46	47	49	54	55	56
63	65	67	69	76	78	85	88	90	92	94	99	100	102	107	114	123	125	126
129	130	135	138	145	155	164	172	175	176	177	182	184	185	186	188	191	192	197
198	207	209	214	224	227	232	233	234	236	245	246	255	259	261	265	266	267	269
271	273	276	277	278	280	281	284	287	288	289	290	293	297	299	302			

New Products, pages 101 to 103:

11-1	11-2	11-3	11-4	11-5
11-6	11-7	11-8	11-9	11-10
11-11	11-12	11-13	11-14	

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Need more facts about advertised products? Mail your Readers' Service card now.



### Economical Construction For Tanks and Digesters

288. Design, engineering, construction, equipment and supervision are offered by Concrete Storage, Inc., 30 Vesey St., New York 7, N. Y., specialists in the construction of concrete liquid storage facilities such as reservoirs and digestion tanks. A handsome brochure describing these services and featuring the economical sliding-form technique is available by checking the coupon.

### SNOW AND ICE CONTROL

#### Uniform Salt Spreading Saves Material

145. The wide, thin pattern provided by Tanco "Scotchman" spreaders avoids salt waste, saves time and labor. Get Folder BL for full

details on this spreader and table of material application rates. Use coupon or write Tarrant Mfg. Co., Dept. FW, Saratoga Springs, N. Y.

#### Snow Plows for Every Street and Highway Need

227. In a new bulletin, No. 51-F, full details are given on the Frink reversible trip-blade "Sno-Plow", which has special design features to eliminate chatter and to permit quick adjustment to nine plowing positions or scraping position for ice removal. Check the coupon for your copy. Frink Sno-Plows, Inc., Clayton, N. Y.

#### Ice Control Without Salt Corrosion

233. This year, team up Banox with salt used for ice control and stop the complaints of salt corrosion. Just 1 pound to 100 pounds of salt neutralizes corrosive effects. Banox is harmless, colorless, odorless. Check the coupon now for full details on this chemical. Calgon Inc., Hagan Bldg., Pittsburgh 30, Pa.

### Motor Driven Tailgate Spreader Fits on Your Truck

244. Hi-Way Model DD Tailgate Spreader can be quickly attached to any standard dump truck body for easy, uniform application of abrasives or salt to icy roads; for resurfacing operations; or for dust control with calcium chloride. Get full data on this durable and dependable spreader from Highway Equipment Co., Cedar Rapids, Iowa. Check the coupon today.

### CONSTRUCTION EQUIPMENT AND MATERIALS

#### How to Keep Trenching Jobs on Schedule

24. The easy maneuverability of the tough, compact Cleveland Model 95 "Baby Digger" makes it well suited for the difficult job of trenching past the many obstacles of city and suburban work. Multiple digging and crawler speeds handle all soil types and trench widths up to 24". Get Bulletin S-52 from Cleveland Trencher Co., 20100 St. Clair Ave., Cleveland 17, Ohio.

#### What's Your Digging Problem? Repair Work? Trenches? Footings?

35. At today's prices, hand digging means the job will be costly. You can dig through asphalt and macadam, work fast and efficiently even in cramped areas with the tractor mounted Sherman Power Digger. From one position you can reach to dig 10 feet behind tractor in 140° arc and to depths of 8 feet. For full details check the coupon, Sherman Products, Inc., Royal Oak, Mich.

#### Municipalities Make Equipment Dollars Go Further

55. Be sure to get your copy of "Saving Facts" a new illustrated booklet prepared by The Oliver Corp. that shows how equipment dollars can be stretched on municipal work. Text and photos describe the application of tractors and money-saving attachments in street maintenance, snow removal, waste disposal, pipe laying and other projects. Write The Oliver Corp., Industrial Div., 400 W. Madison, Chicago, Ill., or check coupon.

#### Tractors for Counties, Cities and Contractors

76. An attractive 24-page catalog portrays the Allis-Chalmers HD-5 crawler's abundant capacity and ability to meet the variable needs of counties, townships and contractors. Photographs and cutaway views illustrate its rugged construction and simplified maintenance. Use coupon or write Allis-Chalmers Mfg. Co., Tractor Division, Milwaukee 1, Wis.

#### Examining a Tractor Piece by Piece

99. The new 32-page catalog published by International Harvester Company should be studied by every tractor owner, for in it each unit from engine to track of the TD-9 Diesel is considered separately. These piece by piece discussions are supplemented by notes on easy servicing, versatile applications and attachments for every need. Get your copy of form CR-33-A from International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill., or check the handy coupon.

#### Helpful Booklet on Carryable Centrifugal Pumps

129. A booklet prepared to give practical information that will guide you in choosing the best type of pump for your requirements is offered by the Homelite Corp. Both gasoline and electric models are discussed, and requirements outlined for many applications. Just check the coupon for your copy. The Homelite Corp., 2125 Riverdale Ave., Port Chester, N. Y.

#### Gunite Costs Less On Repair Jobs

255. Be sure to investigate Gunite for repair of reservoirs, dams, water and sewage plant tanks, sewers, swimming pools, etc. Contact Eastern Gunite Co., Elkins Park, Pa. for full information, or use coupon.

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For complete information on how the Sherman will cut your digging costs, write today for free literature N36.



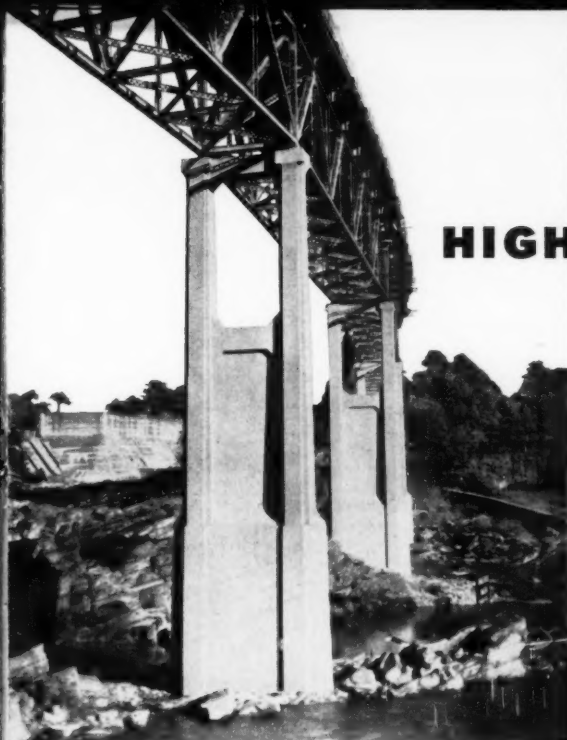
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LOS ANGELES (48), . . . . . 6399 Wilshire Blvd.	SANTA CLARA, CAL. 649 Alviso Road

### Not Sure You Need A Hydrocrane? Just See What One Can Do!

185. In one of the most appealing bulletins we have seen there are over 100 illustrations showing the versatile, all-hydraulic Hydrocrane performing dozens of different jobs. You could keep one busy with digging, trenching, backfilling, cleaning catch basins, loading and unloading, hoisting and erecting, materials handling, placing pipe, and on many other applications. For the full story of this mobile, truck-mounted machine just check the coupon today. Bucyrus-Erie Co., South Milwaukee, Wis.

### Profitable Construction with Payloader

234. A comprehensive, 12-page catalog filled with on-the-job photos showing a wide variety of earth-moving, material-handling, lifting and carrying jobs being performed by the multi-purpose tractor-shovels known as "Payloaders" is now available. Helpful job data, specifications and features of the complete Payloader line are included, with illustrations of useful accessories. Copies of this colorful catalog No. 217 can be obtained from The Frank G. Hough Co., 761 Sunnyside Ave., Libertyville, Ill., or by checking the coupon.

## REFUSE COLLECTION AND DISPOSAL

### Efficient Material Handling to Reduce Incineration Costs

130. Blaw-Knox Buckets specially designed for refuse and garbage handling are described in 22-page Bulletin 2350. Illustrations show progress of material through a modern municipal incinerator plant. Dimensions and incinerator bucket specifications are included. Blaw-Knox Div., 2124 Farmers Bank Bldg., Pittsburgh 22, Pa.

### How Load-Packers Reduce Refuse Collection Costs

123. The sequence of operation for fast loading and refuse compression in the Gar Wood "Load-Packer" is illustrated and described in 8-page folder M 60, which also provides size data and details of hydraulic equipment. Be sure to check all features of the efficient Load-Packer system. Check coupon or write Gar Wood Industries, Wayne Div., Wayne, Mich.

### Investigate This Plan For Garbage Elimination

164. A new presentation, written especially for municipal officials, offers a modern solution for the garbage disposal problem. Be sure you have this up-to-date information on the elimination of city garbage collection by the use of Hotpoint Disposall units. Check the coupon now. Hotpoint Disposall Department, 5600 West Taylor St., Chicago 44, Ill.

### Increasing the Efficiency of Bulk Rubbish Collection

177. Strategically spotted bulk containers can be handled by one man operating a Dempster-Dumpster equipped truck. Get full details of this cost-saving system of rubbish collection, as used by many cities to increase efficiency and eliminate unsanitary conditions. Write Dempster Brothers, Inc., 952 Dempster Bldg., Knoxville 17, Tenn., or use the handy coupon.

## SEWERAGE AND WASTE TREATMENT

### What You Should Know About Trickling Filter Underdrains

20. Specifications for vitrified clay underdrain blocks conforming to ASTM standards, suggestions for layout and construction of trickling filter floors, dimensions of standard blocks, channel covers, angles and other fittings are available from the Trickling

Filter Floor Institute, % Editor, Public Works, 310 E. 43rd St., New York 17, N. Y. Check the coupon and we will forward your request.

### Complete Catalog for Engineers Shows Water and Sewage Plant Equipment

191. The complete line of Jeffrey equipment for treatment of water, sewage and industrial wastes is covered in 52-page Catalog 833. Detailed information is provided on bar screens, grinders, grit collectors, "Jigrit" washers, sludge collectors, feeders, conveyors and other related units. Photos and drawings of installations plus capacity tables complete this valuable booklet. Use coupon or write Jeffrey Mfg. Co., 947 N. 4th St., Columbus 16, Ohio.

### Valuable Booklet on Porous Diffuser Plates and Tubes

21. A helpful 20-page booklet published by the Norton Co. is a complete guide for the selection of porous media for installation in activated sludge plants. Full data for the designing engineer is provided by careful detailing of physical characteristics of plates and tubes. Maintenance of porous media also is discussed at some length. For your copy of Form 1246, write to the Norton Co., Dept. PW, Worcester 6, Mass., or use the coupon.

### How Cities Clean Sewer Lines From Street in One Operation

23. In a helpful 28-page handbook of sewer cleaning methods and equipment the makers of O.N. Champion sewer cleaners give full details of power and hand operated models. Also included are data on expansion buckets that take dirt from sewer to street in one operation, root cutters and other accessories. Get your copy by checking coupon. Champion Corp., 4752 Sheffield Ave., Hammond, Ind.

### Packaged Sewage Treatment— Just Right for Small Plants

36. "Packaged" Sewage Treatment Plants specifically developed for small communities—100 to 3,000 population. Write for full description and actual operating data for this type of plant. Chicago Pump Co., 622 Diversey Hwy., Chicago 14, Ill.

# The "PELICAN" PUMP

## THE WONDER PUMP OF THE *Lightweight Field*

### AND THE LOWEST PRICED TWO-INCH PUMP OF ITS CAPACITY ON THE MARKET!

The "Pelican" self-priming centrifugal pump challenges any pump its size and type to equal it in performance. Quickest priming, Fastest pumping, Most dependable Suction Lift - up to 25 feet, sea level.

Automatic Self-priming - no ports, no valves.

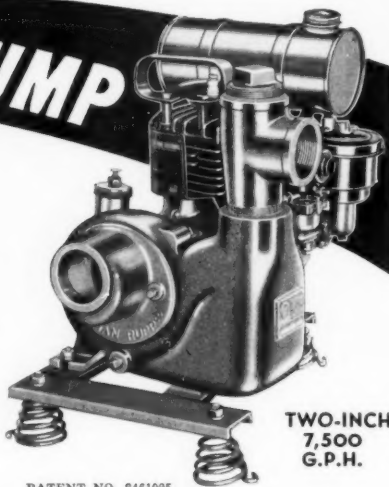
Portability - weighs only 70 pounds, provided with carrying handle for easy portability.

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The "Pelican" is a reliable, trouble-free, general utility pump small enough for easy handling and large enough for a wide range of applications in municipal utility field.

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### FOUR GORMAN-RUPP LIGHTWEIGHTS

The Midget, 1½" - wgt. 62 lbs., 5500 g.p.h. Primes in 75 sec. at 25 ft. suction lift.

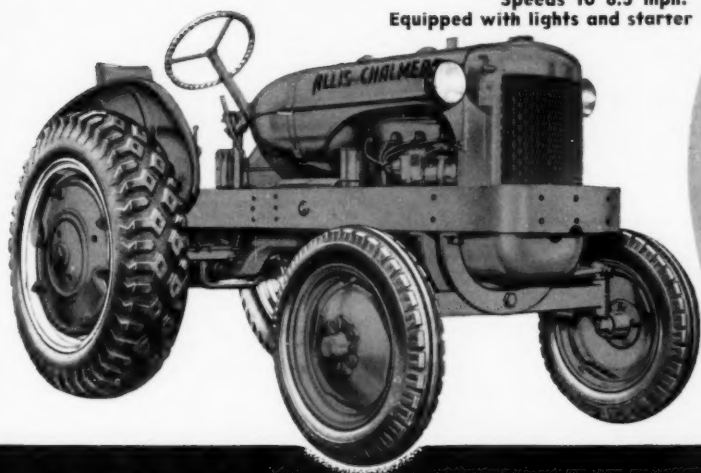
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18 Drawbar hp.  
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The hard-working Allis-Chalmers IB Tractor knows no season. With broom, snowplow, crane and sickle bar, it makes an ideal community tool.

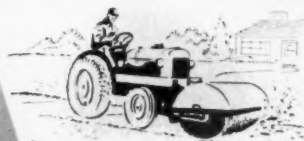
Compact design, short turning radius and low center of gravity enable operator to work quickly, but safely, in close quarters and on steep slopes. Quick-hitch drawbar lets him hook onto and release loads from the seat...makes his job easier and safer.

See your nearby Allis-Chalmers dealer and ask him for a demonstration. He'll be glad to *show* you how the IB can help you cut costs *all year-round*.

**ALLIS-CHALMERS**  
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.  
*...the Finest line on Earth*



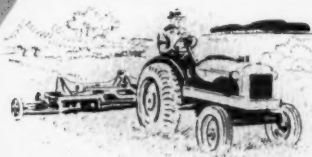
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Brushing Snow from Walks,  
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### How to Make Better Sewer Pipe Joints

37. How to make a better sewer pipe joint of cement—tight, minimizing root intrusion, better alignment of joint. Permits making joints in water-bearing trenches. General instructions issued by L. A. Weston Co., Dept. P.W., Adams, Mass.

### A Handbook of Sewer Cleaning Equipment and Methods

46. A new, fully illustrated 40-page booklet shows every sewer cleaning operation with "Flexible" tools. Includes data on the fast and easily operated new SewerRoder and full engineers' specifications for power bucket machines. For your copy write Flexible Sewer Rod Equipment Co., 9059 Venice Blvd., Los Angeles 34, Calif.

### How You Can Dispose Of Sewage Solids

54. Nichols Herreshoff incinerator for complete disposal of sewage solids and industrial wastes—a new booklet illustrates and explains how this Nichols incinerator works. Pictures recent installations. Write Dept. PW, Nichols Engineering and Research Corp., 70 Pine St., New York 5, N. Y.

### Make Your Own Concrete Pipe For Sewers and Culverts

65. Machinery for making concrete pipe for sewers and culverts, both plain and reinforced, sizes 4" to 36", is described in bulletins of the Concrete Pipe Machinery Co., Sioux City 17, Iowa. Either bell and spigot or tongue and groove can be made. Get full details by using the coupon.

### Odorless Sanitary Septic Tank Cleaning

88. The Gorman-Rupp Odorless Sanitary Cleaning unit combines centrifugal self-priming pump, air-cooled engine and oval tank on a sturdy frame. For full description of this adaptable unit get bulletin 7-ST-11. Gorman-Rupp Co., 120 N. Bowman Ave., Mansfield, Ohio.

### Specifications for Jointing Reinforced Concrete Pipe

63. Engineering specifications for use of Hexseal rubber gaskets with reinforced concrete sewer pipe are contained in a new brochure published by Universal Concrete Pipe Co., Dept. PW, 297 S. High St., Columbus, Ohio. Subjects include dimensions, pipe design reinforcement, curing and jointing instructions. Get your copy by checking the coupon.

### Using Sewage Sludge Gas For Power Generation

90. Fairbanks-Morse dual fuel engines can operate on either sludge gas or oil to provide steady power output despite fluctuations in gas supply. Bulletins are available on several sizes to meet your needs. Write, giving exact requirements to Fairbanks, Morse & Co., Dept. PW, 600 So. Michigan Ave., Chicago 5, Ill. or use handy coupon.

### Get the Facts on

#### The Contact Aeration Process

94. Full engineering details on the submerged contact aeration process of sewage treatment, including diagrams of plant units, area requirements, operating costs and other details are available in a bulletin of the Hays Process Co., Box 768, Waco, Texas. Check the coupon to get the facts.

### Efficient Blowers for Activated Sludge Plants

232. Many advantages of Roots-Connorsville positive displacement rotary blowers are described in Bulletin 22-23-B-13, which also provides characteristic curves for operation with constant speed, multi-speed and variable speed motors and details of several types of blowers. Get this helpful bulletin by checking the coupon. Roots-Connorsville Blower Corp., Connorsville, Ind.

### Grinders and Shredders

#### For Sewage Treatment Plants

245. Gruendler screenings shredders may be connected with bar screens at either new or existing plants to reduce operating expense

and simplify disposal problems. Full descriptions of screenings shredders and dry sludge shredders are reported in Bulletin SG10, issued by Gruendler Crusher & Pulverizer Co., 2915 N. Market St., St. Louis 6, Mo. Just check the coupon.

### End Root Problems

#### With Root-Proof Sewers

107. Troubles caused by roots and corrosion in house connections can be eliminated by the use of root-proof Ilermics sewer pipe. Full details on this smooth, waterproof, tight-sealing pipe available by checking the coupon, or write to the Brown Co. Dept. PW, 150 Causeway St., Boston 14, Mass.

### Non-Clogging Vertical Wet-Pit Pump Described

182. Full engineering data on Worthington "Freeflo" wet-pit pumps with non-clogging impellers capable of passing solids and stringy material are included in Bulletin W-317-B12. Check these pumps for pump, sewage and drainage service. Bulletin available from Worthington Corp., Harrison, N. J. Just use the coupon.

### Design Data for Insulated Piping

189. For all jobs where insulated piping is required you will want full design data on Ric-wil. Prefabricated Insulated Piping. Get 28-page catalog from the Ric-wil Co., Cleveland, Ohio, for details on both underground and overhead lines.

### Reference Book on

#### Lubricated Plug Valves

273. Lubricated plug valves, including stick-proof lever sealed valves for easy operation and positive mechanical seal are fully described in reference books issued by Homestead Valve Mfg. Co., Box 350, Corapolis, Pa. Check the coupon for your copy.

### How to Dispose of

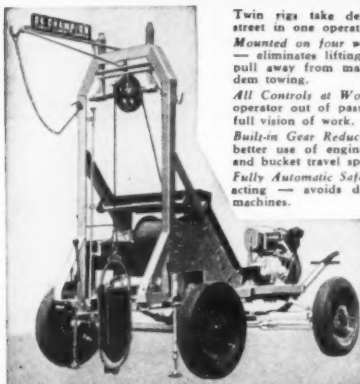
#### Sewage and Industrial Sludges

281. Get full information on the C. E. Raymond System of combined incineration and

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Twin rigs take debris from sewer to street in one operation.  
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Please send information on new OK Champion Power Sewer Cleaners.

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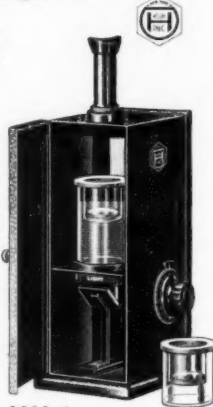
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Modern in design and operating principle, the Hellige Turbidimeter does not require standard suspensions or long cumbersome tubes. Accurate readings can be made rapidly by those without technical training.

Precise determinations are performed in the ranges of zero to 150 p.p.m.  $\text{SiO}_2$  and zero to 100 p.p.m.  $\text{SO}_4$ . Higher values are determined by diluting the specimen.

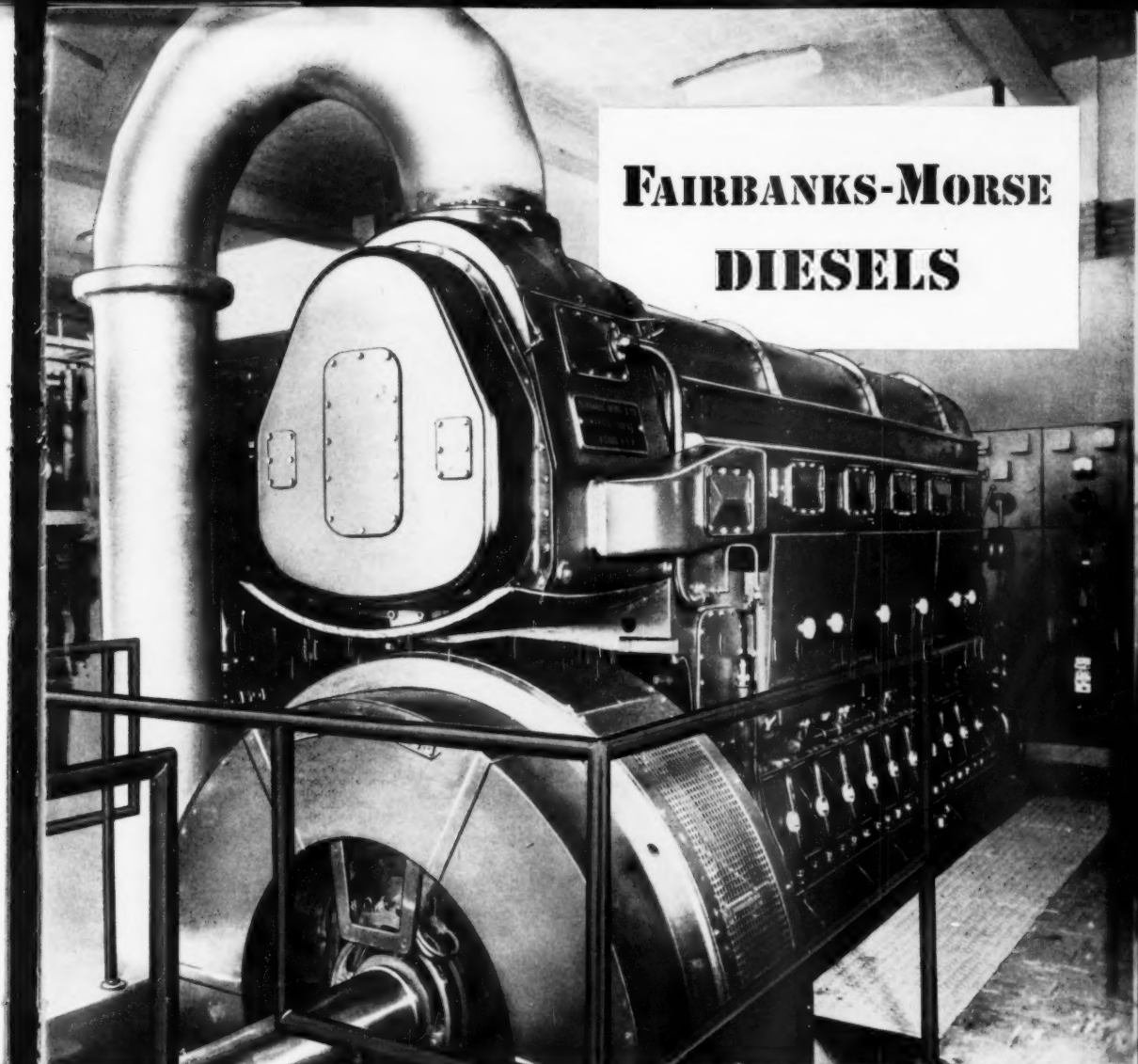


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For the 12-month period that Glencoe's four F-M diesels operated on crude oil alone, fuel savings amounted to \$8,618.20. KWH production was increased more than 8% over the previous fiscal year!

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Put your power costs in order with Fairbanks-Morse diesel engine economies. Write today for qualified engineering assistance on your power problems. Fairbanks, Morse & Co., Chicago 5, Ill.



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sludge drying providing high temperature deodorizing for nuisance-free sludge disposal. Flexible layouts fit large and small communities. Use handy coupon or write Combustion Engineering-Superheater, Inc., Flash Dryer Div., 200 Madison Ave., New York 16, N. Y.

#### How Vacuum Filters Help Your Sewage Sludge Disposal

209. Applications of the Conkey sludge filter to all types of sewage sludge are described in Bulletin 100. Tables show filter sizes, weights, and give anticipated average results. Use the coupon to order your copy. General American Transportation Corp., Process Equip. Div., New York 17, N. Y.

## POWER AND LIGHT

#### Modern Power Plants Need Diesel Economy

67. Baldwin Series 700 diesel engines are described in a new bulletin, No. 320, just issued by the Baldwin-Lima Hamilton Corp., Philadelphia 42, Pa. These engines are four-cycle with a 17-inch bore, 20-inch stroke, 257 to 375 rpm. Horsepower ratings range from 710 hp. to 2,080 hp. Check coupon now for full data.

## WATER WORKS

#### The Modern, Streamlined Elevated Tank

32. A new 8-page bulletin describes the Watersphere, a modern elevated water tank of welded steel construction for general service gravity water pressure and fire protection. Construction details, illustrations of typical installations and table of standard sizes from 25,000 to 250,000 gallons capacity are included. Check the coupon. Chicago Bridge & Iron Co., 2115 McCormick Bldg., Chicago 4, Ill.

## WATER ANALYSIS SIMPLIFIED!

with a Taylor Water Analyzer for pH . . . and other determinations

Easy to use—accurate results in a few minutes—no fragile single standards to handle—no lab training necessary—these and many more advantages are yours when you use a Taylor Water Analyzer for determining pH, Color, Manganese, Total Iron, Ammonia, Chlorine, Nitrite N, Nitrate N, Fluoride, Copper.

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All color standards for any one determination are mounted in a sturdy plastic slide and carry an *unlimited guarantee against fading!* Taylor sets come to you complete with base, slide, accessories and reagents. Most slides work on the same base.



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for sets or write direct for free reference book illustrating and describing Taylor sets and uses in 34 basic industries.

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#### Is Your City Metered 100%?

33. 100% metering as practiced by many cities requires accurate, dependable meters with interchangeable parts. Cut-away views of every part, capacity and size data are all included in handsome American-Niagara water meter booklet available from Buffalo Meter Co., 2920 Main St., Buffalo 14, N. Y.

#### Seven Advantages of Prestressed Concrete Steel-Cylinder Pipe

43. All the things you want in water supply lines: permanency, structural strength, high carrying capacity, easy tapping, design flexibility, easy installation and economy are claimed for Prestressed Concrete Steel-Cylinder Pipe made by Price Brothers Co., 1932 East Monument Ave., Dayton 1, Ohio. Get full details by checking the coupon.

#### Engineering Data on Diatomite Filters

44. Detailed information and typical plans of Sparkler diatomite filters for swimming pools of municipal water systems is available to engineers and municipal officials. These filters feature self-cleaning filter elements which cut wash water to a minimum. Get this material now by using coupon. Sparkler Manufacturing Co., Mundelein, Ill.

#### Handbook of Contractors Pumps Is Easy to Use

49. Big 50-page Catalog P-10 covers de-watering pumps, pressure pumps, well point systems and electric pumps, and also features a special section of useful data which helps in the selection of the right pump for your job. Every construction engineer and contractor should have a copy of this valuable handbook. Just check the coupon. The Jaeger Machine Co., 400 Dublin Ave., Columbus 16, Ohio.

#### Turbidity Color and Hardness Removal

56. Modern water pre-treatment with Dorr equipment and methods is described in Bulletin No. 9141, which gives basic design data and special section of useful data which helps in the selection of the right pump for your job. Every construction engineer and contractor should have a copy of this valuable handbook. Just check the coupon. The Jaeger Machine Co., 400 Dublin Ave., Columbus 16, Ohio.

#### Efficient Coagulation With Ferri-Floc

69. Advantages claimed for Ferri-Floc as a coagulant include wide pH range, quick floc formation, manganese removal, control of certain tastes and odors, plus other aids in high quality water production. Check coupon for complete Ferri-Floc data. Tennessee Corp., Grant Bldg., Atlanta, Ga.

#### Floatless Liquid Level Controls

92. Complete descriptions of electrode type floatless liquid level control systems, including control units, electrodes and fittings, panel assemblies and diagrams of typical installations for all types of municipal service are covered in the 32-page catalog of Charles E. Warrick Co., 1975 W. Eleven Mile Rd., Berkley, Mich. Check coupon for your copy.

#### Useful Data on Butterfly Valves

100. Complete descriptions and tables of dimensions on the full line of Rockwell Butterfly Valves is contained in several bulletins published by the company. Construction details and special control features are illustrated. Write W. S. Rockwell Co., 200 Eliot Street, Fairfield, Conn.

#### Tested Jointing Materials

102. "Hydrotite" is a self-caulking, self-sealing joint compound for bell and spigot pipes. For data book and sample write Hydraulic Development Corp., 50 Church St., New York, N. Y.

#### How to Tap Concrete Pressure Pipe

126. The simple steps required in making a pressure tap in concrete pressure pipe are explained in a booklet issued by Lock Joint Pipe Company. Be sure you know how either

large connections or small service outlets may be made economically and without sacrifice of strength. Just check the handy coupon. Lock Joint Pipe Co., Box 289, East Orange, N. J.

#### How Accurate Boring Speeds Underground Pipe Installations

135. Interesting charts showing earth boring costs, speed and accuracy for holes from 2 1/2" to 14 1/2" diameter and up to 80 feet long are included in 16-page Catalog No. 8 issued by Hydrauger Corp., 681 Market St., San Francisco 5, Calif. Specifications and general operating instructions are also covered.

#### Helpful Data on Mechanical Joints

138. Get Circular 49 from M & H Valve & Fittings Co. for important information and installation dimensions of M & H AWWA Mechanical Joint Valves and Hydrants. Features include ease of installation, construction economy, long life. Use coupon or write M & H Valve & Fittings Co., Amniston, Ala.

#### Pressure Reducing Regulator Has High Inlet-to-Outlet Ratio

172. Get full data on the new 50-G2 pressure reducing regulator that permits inlet-to-outlet ratios of 250 to 2 lbs. at accuracies approaching instrument control. Bulletin G-101, available from Foster Engineering Co., 825 Lehigh Ave., Union, N. J. gives full details. Check the coupon.

#### Your Property Is Worth Good Protection

176. When installing link fence you want protection against rust and corrosion as well as vandalism. Investigate chain link fence made of "Kontik" metal described in "Planned Protection" published by Continental Steel Corp., Kokomo, Ind.

#### Locate Mains and Services Without Digging

186. A 16-page booklet tells how to use the Fisher "M-Scope" to locate buried pipes and valves by electronic means. Proper manipulation also determines depth of cover. Battery operated unit is readily carried by one man. Get data from Fisher Research Laboratory, Inc., 1961 University Ave., Palo Alto, Calif.

#### Data on Mixers For Flocculation Tanks

245. Full data on Link-Belt Straightline mixers for flocculation tanks will be found in Folder No. 2042, issued by Link-Belt Co., 2045 W. Hunting Park Ave., Philadelphia 40, Pa. Layouts of typical tank arrangements are included. For your copy just check the coupon.

#### How to Compute Quantities of Jointing Materials

271. A helpful table for determining quantities of "Tegul-Mineraloid" required, using jute or "Hyde-Ro Rings", plus complete answers issued by Atlas Mineral Products Co., Mertzown, Pa. Check the handy coupon today.

#### Heating, Thawing and Melting With Hauck Burner Equipment

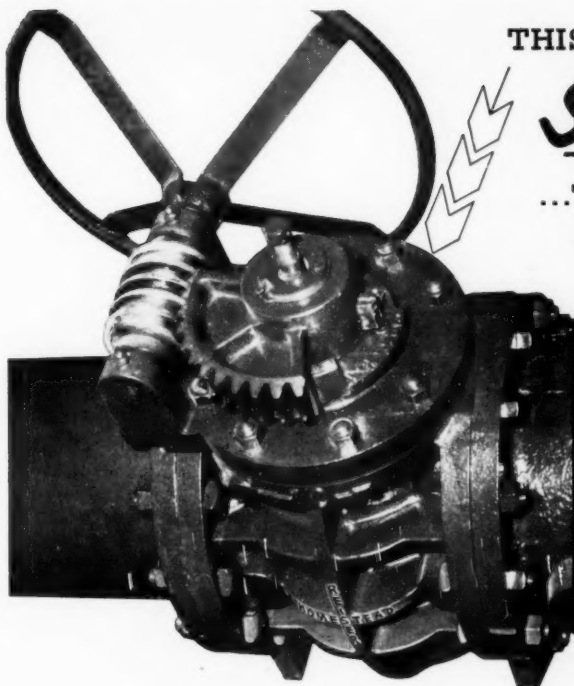
277. A helpful 16-page bulletin covers the complete line of Hauck heating and melting equipment. Data covers units for every water, sewer and street department purpose, from "one-man" burners to large size portable kettles. For a useful addition to your reference file, get Bulletin 1068 from Hauck Mfg. Co., 117-127 Tenth St., Brooklyn 15, N. Y.

#### Standard Specifications for C. I. Pipe and Fittings

278. Standard dimensions for cast iron water pipe and special castings are available in a convenient booklet offered with the compliments of U. S. Pipe and Foundry Co., Burlington, N. J. Get your copy by checking the coupon.

#### Two-Way Radio Equipment For All Departments

293. The benefits of two-way radio communication in the un congested non-interference 450-megacycle range make full information on this subject important to all engineers. Get full data on trouble-free systems from Motorola, Inc., Dept. PW, 4545 Augusta Blvd., Chicago 51, Ill. Just check the coupon.



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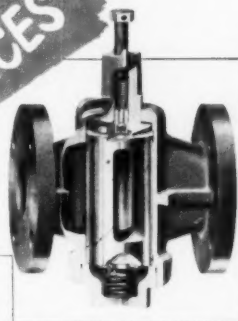
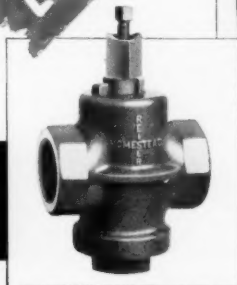
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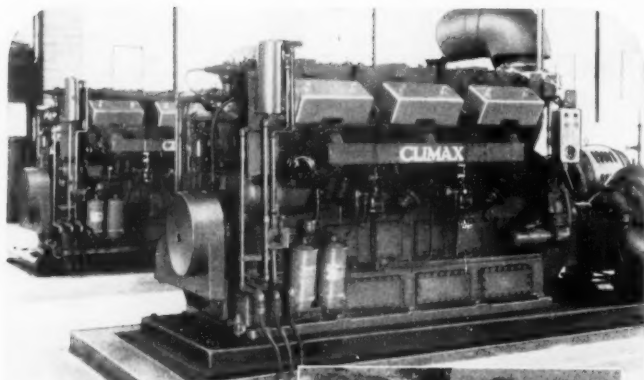
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Sectional View of Full Port Area Homestead-Reiser Valve

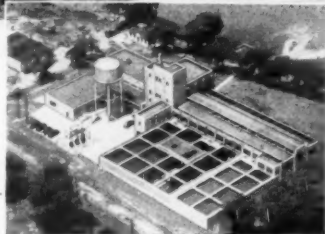
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Moline, a fast growing industrial city in Western Illinois, installed two Climax 12 cylinder and one 6 cylinder engines to guard their water supply. They are used as standby power for pump units during electrical power failures.

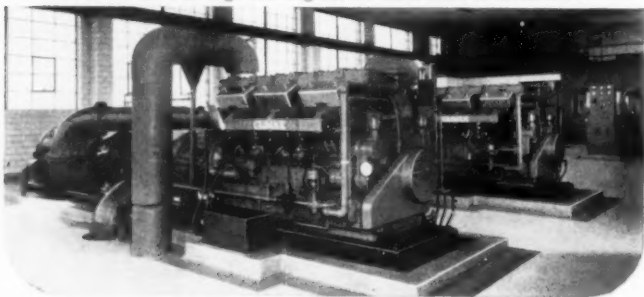
Selected because of their low upkeep expense, economy and their ability to provide quick dependable power to meet all emergency demands. Climax Engines have been approved and preferred by a growing number of municipal water works for standby service.



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Factory and General Office: Clinton, Iowa  
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For emergency use in water works Climax Engines are rated from 75 to 600 H.P. Sewage Gas Engines are rated from 50 to 250 H.P.



## **WATER WORKS (Cont.)**

### **What You Should Know About Fluoridation and Fluoridators**

153. Two helpful publications issued by Wallace & Tiernan titled "Fluoridation" and "Fluoridators" show the development of fluoridation, list the chemicals and dosage normally used, and give full technical data on solution feed and dry feed fluoridators. Be sure to get these publications from Wallace & Tiernan by checking the coupon today.

### **Handy Calculator for Cast Iron Pipe**

175. With the handy Cast Iron Pipe Calculator you can determine at a glance the class, weight and dimensions of bell and spigot pipe. This slide-rule type calculator is absolutely free. Use coupon or write R. D. Wood Company, Public Ledger Bldg., Philadelphia 5, Pa.

### **Installation Guide for Transite Pressure Pipe**

192. A convenient, pocket-size book of 115 pages covers the whole job from receiving and handling pipe to pressure and leakage tests of finished lines. Over 100 drawings show important operations, and the text tells both how and why. Copies are available from Johns-Manville, Dept. PV, 22 E. 40th St., New York 16, N. Y.

### **Technical Service Offers Help on Fluoridation Planning**

207. Helpful information to assist in planning new installations and improvement of existing fluoridation systems is available from General Chemical Div., Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y. Check the handy coupon today.

### **Are You Ready Now To Make Main Repairs?**

214. Broken water mains can quickly be repaired when you have "Skinner-Seal" Split Coupling Clamps on hand. Get Skinner Catalog 41 now—this handsome 40-page book shows how to make every type of pipe repair and covers a complete line of clamps to do the job quickly and easily. Just check the handy coupon for your copy. M. B. Skinner & Co., So. Bend 21, Ind.

### **Does Your Water Works Have Standby Power?**

224. Dependable Climax power plants are ready for emergency service to insure fire protection, and can also save power costs by peak load operation. Use the coupon for full data on Climax, 40 to 495 HP, operating on sewage or natural gas, butane or gasoline. Climax Engine & Pump Mfg. Co., 208 So. La Salle St., Chicago 3, Ill.

### **Helpful Valve Catalog For Engineers**

236. For complete descriptions of Darling double disc, parallel seat gate valves be sure to get Bulletin 5002 issued by Darling Valve & Mfg. Co., Williamsport, Pa. Construction details covering all valve parts and accessories are helpful for specification writers. Check the coupon for your copy.

### **Water Conditioning Data Book Offered To Engineers**

259. All engineers and municipal officials concerned with water conditioning will want a copy of the greatly enlarged edition of the popular Permutit Data Book prepared by the Permutit Co., 330 West 42nd St., New York 18, N. Y. This completely revised book presents a compilation of 77 tables, all valuable to the engineer. Subjects include hydraulics, impurities in water, reactions and conversions of chemicals used in water treatment, alkalinity relationships and other helpful material.

### **Corrosion Protection For Water Works**

280. Steel pipe lines, elevated tanks, treatment plant equipment and all other steel structures subject to rust, tuberculation and attack by aggressive soils can be protected by long-lasting Bitumastic enamels. Send for bulletins today so that you can specify the right coating for your job. Use coupon or write Koppers Co., Tar Products Div., Dept. 255T, Pittsburgh 19, Pa.



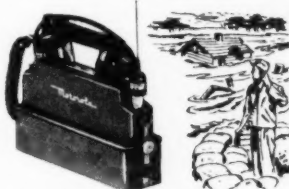
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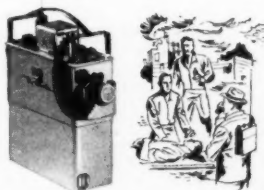
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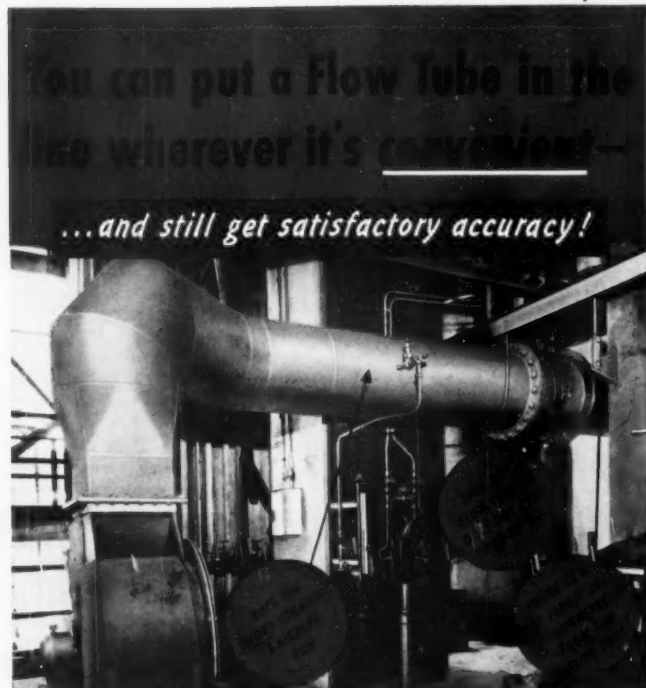
Dozens of American cities now use Motorola 2-way radio to mobilize manpower quickly, co-ordinate emergency forces, speed action in times of crisis. Motorola radio centralizes controls . . . brings on-the-spot reports . . . provides instant contact wherever a man or vehicle can go.

Your city, too, will find that Motorola is today's greatest value in 2-way radio. Eight exclusive features guarantee top performance . . . time-tested durability with the lowest overall maintenance costs in radio history . . . and obsolescence-proof design. Motorola gives you simplified operation, rugged construction, outstanding dependability. Fully-qualified Motorola engineers in your locality are anxious to help you with your communication problems—write today!

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The Flow Tube needs only minimum straight runs entering and following the tube, and the Flow Tube itself takes up so little space that it can be installed at practically any accessible point where flow conditions are reasonably steady. This means considerable savings in space and equipment to provide straight entering runs required by conventional head meters.

The installation shown above in a catalytic cracking unit of a Southwestern oil refinery is a typical example. Here a 30" Flow Tube with a 23.9" throat ( $D/d=1.26$ ) is measuring the air used to reactivate the catalyst. It delivers a differential of 10" of water for a maximum flow of 39,000 standard cfm at 137°F. and 3.5 psig. The unrecovered

head loss in this Tube at maximum flow is 1" of water. Two other tubes are also operating under similar conditions in this refinery.

All are performing satisfactorily as installed. Periodic checks all show that they are measuring within plus or minus 2% of the blower manufacturer's characteristic curve.

Flow Tubes are manufactured exclusively by Foster Engineering Co. in all pipe sizes for measuring the flow of liquids and wet or dry gases. Flow Tubes can be furnished with or without suitable secondary indicating, recording, or totalizing instruments. For further information, ask for Bulletin FT-101; and for specific recommendations, please send us necessary flow data.

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### Factors to Consider in Elevated Tank Selection

299. Details on the several different types of elevated steel tanks, including capacity ranges, tank dimensions and other factors to be considered in the selection of elevated tanks for modern water storage, plus discussions of new tanks for old towers and foundations are included in Bulletin 101 of the Pittsburgh-Des Moines Steel Co., Neville Island, Pittsburgh, Pa. Check coupon for your copy.

### Cleaning Service for Every Type of Pipe Line

302. Flexible Pipe Cleaning Co., operating with specialized equipment and trained crews, is prepared to remove scale, rust and other deposits from pipes for every type of service. For details and estimates furnished without obligation write Flexible Pipe Cleaning Co., Box 167, Los Nietos, Calif. or check the coupon.

### PEST CONTROL

#### Latest Information On Effective Insecticides

198. Complete information on proper application and formulations of Chlordane and other effective insecticides for fly and mosquito control is available from the Velicol Corp., 330 E. Grand Ave., Chicago 11, Ill.

### STREETS AND HIGHWAYS

#### Use Hot Patch Material On All Maintenance Jobs

297. With the Barber-Greene Mixall you can get hot patch material wherever and whenever you need it for all maintenance jobs. Send for new 8-page bulletin that gives full information on this small, highly portable unit that turns out all types of bituminous patch material in any quantity you need. Write Barber-Greene Co., Aurora, Ill., or use the coupon.

#### Building State, County and Township Roads

47. The story of better roads for fewer taxpayers' dollars is told in an excellent bulletin describing "Caterpillar" diesel motor graders. These versatile units serve state, county and township bodies all year long on construction, maintenance and snow removal. Get bulletin D831 from Caterpillar Tractor Co., Peoria, Ill.

#### Concrete Saw Cuts Smooth, Straight Edges

83. When the edges of patches and trenches are sawed before breaking, a saving of 25% in removal costs is claimed. And the smooth, straight edges won't spall or crack after replacement material is poured. Investigate the exclusive features that give maximum economy to Clipper concrete saws. Full information from Clipper Mfg. Co., 2823 S. Warwick, Kansas City 8, Mo., or check the handy coupon.

#### Reference Manual on Guardrail Design

114. Here is an interesting and informative booklet in which all factors influencing guardrail design are outlined, and safety and economy discussed in detail. Eight pages are devoted to basic design data, with handy tables covering physical properties, tensile and beam strengths, deflection and other data. Write Armo Drainage and Metal Products, Inc., Dept., PW, Middletown, Ohio.

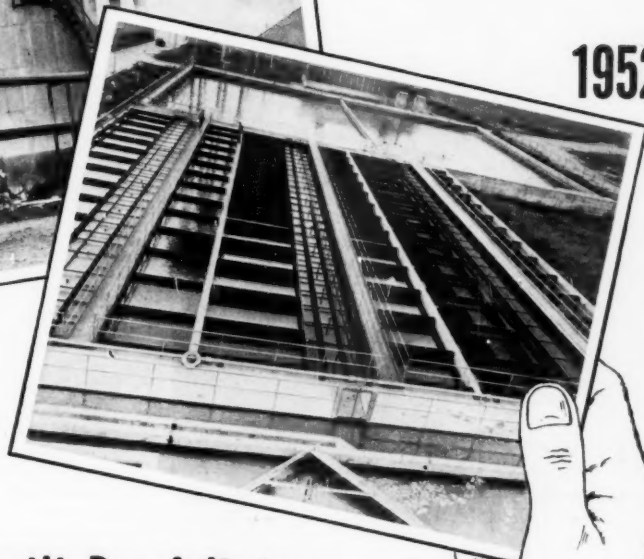
#### Spreaders for Ice Control Work Save Labor and Speed Job

261. Only the driver is needed to spread salt or abrasives for ice control when a Flink Tail-Cat Spreader is used. Hydraulically driven, fully automatic unit is controlled from the cab. Check the coupon for the complete story. The Flink Co., Streator, Ill.

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## Latest Permutit Precipitator Saves Up to 40% in Chemicals

Today's sludge blanket Precipitator is the most advanced and efficient type of coagulation, precipitation and settling equipment. It is particularly economical for the removal of turbidity, color, taste and odor; and for softening water, reducing alkalinity and removing silica by the cold lime-soda process.

The secret of its amazing efficiency and adaptability is the full utilization of the suspended sludge-blanket principle. Upward filtration through a blanket of previously formed precipitates results in the complete usage of lime and other chemicals . . . *saving up to 40%.*

Resultant prolonged and intimate contact prevents the formation of "after deposits" in filters and pipes, which in many cases . . . *eliminates the*

*need for recarbonation.* And an effluent averaging usually less than 5 ppm turbidity is produced . . . *easing the load on filter beds.*

In addition to all these advantages, a one hour detention period gives the same results as 2 to 4 hours in the conventional type . . . *making for a more compact plant.*

For full information write to: THE PERMUTIT COMPANY, Dept. PW-11, 330 W. 42ND STREET, NEW YORK 36, N. Y. or to Permutit Co. of Canada, Ltd., 6975 Jeanne Mance St., Montreal.

P.S. Don't forget that Permutit can also provide tailor-made equipment to convert old conventional settling basins to the modern sludge-blanket Precipitator.

WATER CONDITIONING HEADQUARTERS FOR 40 YEARS

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ing Outfits. Fast—efficient—powerful—large  
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**PUBLIC  
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**ENGINEERING  
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**Costs of Repairing Damaged Water Meters**

During the past year, repairs were made to water meters in Toledo, O., as follows: For frost damages to 583 meters, the average cost for  $\frac{5}{8}$ -inch meters being \$6.20, for  $\frac{3}{4}$ -inch meters \$11.45, and for 1-inch meters \$14.64. For hot water damage to 436 meters, the average cost for repairing 425  $\frac{5}{8}$ -inch meters was \$7.73, for seven  $\frac{3}{4}$ -inch meters it was \$7.73 and for four 1-inch meters it was \$12.08. It was necessary to repair 1,283 worn meters, and the costs were as follows: For  $\frac{5}{8}$ -inch \$8.80;  $\frac{3}{4}$ -inch \$11.73; 1-inch \$13.70;  $1\frac{1}{2}$ -inch \$25.33; and 2-inch \$25.43. George J. Van Dorp is Water Commissioner.

**Gravity-Filled Water Tank Serves Sewage Plant**

An elevated tank at San Francisco serves several purposes. It supplies water under uniform gravity pressure for (1) water sprays in the settling tanks; (2) general flushing and washing down jobs around the plant; and (3) domestic use, as drinking fountains, showers and lavatories.

The tank capacity is 15,000 gals.; height to bottom of water capacity is slightly over 98 ft.; the support is a 10-panel, angle post tower designed for a 10% earthquake factor. The filling line is 8-inch, a separate line being used to meet state health department requirements for an air gap. A secondary riser, 4 ins. in size, takes off from the regular riser 65 ft. above ground, thus protecting the domestic supply from the possibility of back-siphonage.

The tank is an ellipsoidal-bottom type and was constructed by Chicago Bridge & Iron Co. Consulting engineer on this job was the Offices of Clyde C. Kennedy, McDonald, Young & Nelson, Inc., and Morrison-Knudson Co., Inc., were the contractors.

**Helping to Solve New York's Refuse Collection Problems**

An additional 140 Gar Wood Load-Packers are being delivered to New York City, making 640 such units in use in that city. New York collects annually 4,000,000 tons or 22,000,000 cubic yards of refuse. To handle this tremendous volume of waste materials, careful tests are made to determine the suitability of the units available. In these, weight and time study data are recorded showing the time required for collection of normal loose material and haulage to barges for dumping. These studies gave statistics on operating time and costs per cubic yard. The Load-Packers, product of Gar Wood Industries, were found to have high payload capacity, fast loading rate and good compaction.

# "HEAVY ASPHALTIC RESIDUALS" run this Hamilton Diesel

**Pioneer tests by Pittsburgh Steamship indicate satisfactory performance—no undue engine wear!**

Though operating records are incomplete, Pittsburgh Steamship recently reported significant results from their pioneering use of Bunker "C" fuel oil in the 21½ x 27½ Hamilton diesel on the 600-foot ore carrier, Eugene W. Pargny.

Except for short periods when maneuvering, entering or leaving port, this engine has been burning heavy residual fuels. Much of this fuel has been supplied from the steel plants in Gary and South Chicago, and is composed of heavy asphaltic residuals used for firing the open hearth furnaces.

A lighter diesel-oil, with an API gravity of about 38.6, is used in the main engine when maneuvering in close quarters around docks or in canal locks, when stopping the main engine for any appreciable period, or when starting up after being stopped for any great length of time.

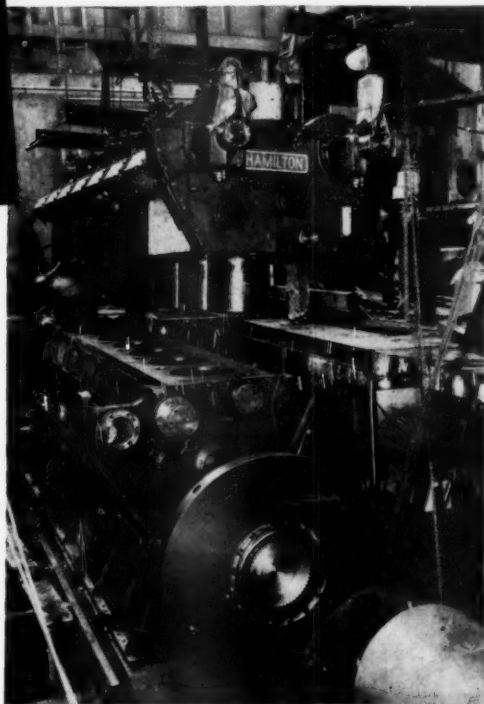
Most recent inspections show cylinder-walls of the main engine to be in very good condition, with no signs of wear beyond that usual for the hours in operation. Fuel-pump and injection equipment maintenance has likewise been normal.

While this experience has been relatively limited, the vessel's performance does indicate that *quite satisfactory operation* with heavy fuels of characteristics given may be expected in the future, although such operation is still in the nature of a pioneer venture at its present stage.

**SQUISH ACTION!** Important reason for the superior performance of this Hamilton diesel is Squish Action—a *better* way to use fuels. Because of *exclusive* rotary valve design, an annular wall chamber, proportioned porting and a semi-hemispherical combustion chamber—*40% more air is trapped in the cylinder*. Then this air is forced into the fuel spray cone just as the piston reaches top dead center.

The result is far better efficiencies . . . an ability to burn the heaviest fuel oils . . . more power . . . less engine wear . . . less maintenance . . . a cleaner, cooler exhaust.

Installation of the 2-cycle, single acting, direct reversible, solid injection Hamilton diesel in the Eugene W. Pargny in 1951.



**WRITE!** If you are looking for marine or stationary diesels, remember that there's a conservatively rated Hamilton or Baldwin-De La Vergne unit for virtually any job in the slow and medium speed range from 550 to 6860 hp.

## ANALYSIS OF FUEL USED IN THE HAMILTON DIESEL THAT POWERS THE EUGENE W. PARGNY

Gravity	API at 60/60	13.1-13.5
Specific Gravity	at 60 °F	.976-.979
Viscosity	SSU at 110°F	2320-3400 secs
	SSU at 210°F	121-147 secs
	SSF at 122°F	122-130 secs
Flash Point PMCC		240°F-255°F
Flash Point COC		280°F-290°F
Fire Point COC		290°F-340°F
Pour Point		25°F-30°F
BTU/LB HHV		18,455-18,715

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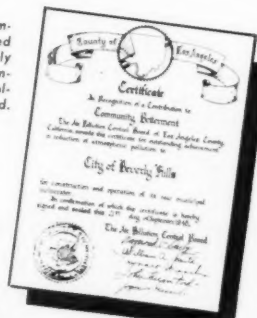


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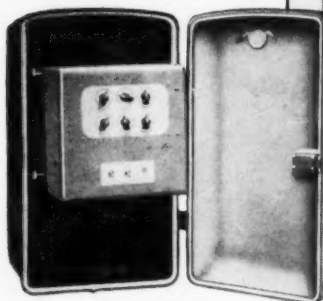
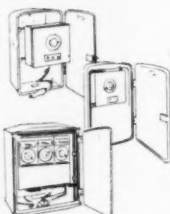


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Front-of-dial adjusting means for changing length of street intervals as well as amber periods.

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Component-type traffic controller constructed of separate units, including cycle dial mechanism, signal contact mechanism, relay mounting facilities, etc.

Traffic controller rotating cycle dial equipped with self-locking removable dial keys.

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## **WOLVERINE TUBE DIVISION**

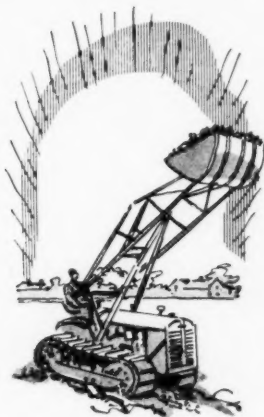
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● CENTRAL BUSINESS DISTRICT of Phoenix, Arizona, after installation of new lighting system. This is part of a four year, \$1,300,000 street light program.

## STREAMLINED PUBLIC WORKS ORGANIZATION GETS RESULTS

**ALBERT R. PIERCE,**

Administrative Aide to the Public Works  
Director, Phoenix, Arizona

IN ORDER to provide a simple and effective organization for the public works program of a fast-growing city, the City Council of Phoenix, Ariz., early in 1950, created a Public Works Department. The duties of the Public Works Director were stated to be as follows: Under the direction of the City Manager, the Public Works Director shall supervise and coordinate the divisions of Utilities, Maintenance, Engineering, Inspections, Streets and such other related divisions of service as may be assigned to him by the City Manager; advise division heads on professional and

technical problems; and perform other duties and responsibilities with reference to organizing, planning, setting policy and making major decisions in the Public Works Department.

Previously, the public works activities of Phoenix were divided among twelve independent departments: Airport, Building Inspections, Mechanical Maintenance, Building Maintenance, Electrical Inspection, Engineering, Plumbing Inspection, Sewage Disposal, Streets, Traffic Engineering, Transportation and Water. These were consolidated into eight divisions, with each division headed by a superintendent. This reduction in number of major units was accomplished largely through reorganization of the Inspections and Water Departments. By creating a division of Building

Inspections and making the Building Inspections, Electrical Inspections and Plumbing Inspections Departments sections of this division, it was possible to reduce the three former departments to one central division. A new section, Mechanical Inspections, was added, providing for inspections of new and existing installations of refrigeration units, boilers and pressure vessels and elevators.

The Water Department was changed to the Division of Water and Sewers. The Sewage Disposal Department was incorporated into this division as a Sewage Treatment Section. Additional sections in the Water and Sewers Division are: Sewer Collections, Water Collections, Water Engineering, Water-Field, Water Production and Water Reservoirs. A new division of Traffic Engineering was created. Previously all traffic functions were in the Police Department, but this proved unsatisfactory from the standpoint of carrying out a successful traffic engineering program.

One other important change was made: The Building Maintenance Department, in charge of the maintenance and custodial care of the city buildings and grounds, was made a section of the Division of Engineering, under the City En-

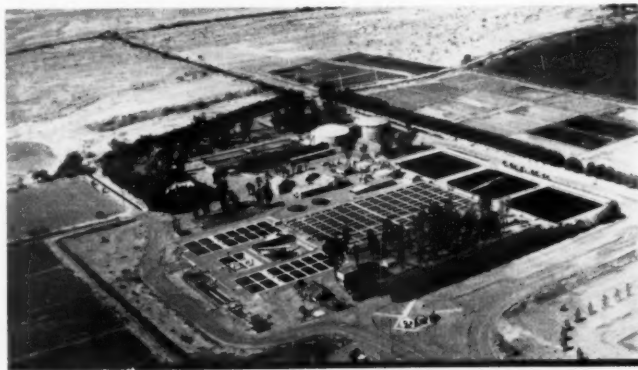


● **NEW TERMINAL BUILDING** of Sky Harbor Airport, shown here under construction, features a giant tubular steel control tower. Estimated cost is \$912,000.

gineer. This change was a wise one, as the Engineering Division has been able to render valuable engineering assistance to this section. However, this section was later made a division.

As a result of these changes, the eight original divisions of the Public Works Department were: Airports, Water and Sewers, Engineering, Street Maintenance, Mechanical Maintenance, Transportation, Building Inspections and Traffic Engineering. The Public Works Director is the only official from the Public Works Department who is directly responsible to the City Manager. Previously, department heads took up much of the City Manager's time on technical or specialized engineering matters, which are better understood and handled by a qualified engineer. The Public Works Director is a registered civil engineer with extensive public works engineering experience. The City Engineer is also a registered civil engineer. By authority of the charter, he is Superintendent of Streets; and he also serves as consultant on water matters. The Division of Engineering is closely connected with all construction projects.

At first, the Water Collections, Sewer Collections and Engineering Sections of the Division of Water and Sewers were housed in the same office. Unsatisfactory service to water customers resulted. The superintendent of the division and his engineering staff were moved into separate quarters and the two collections sections were placed under a special supervisor. This change increased the efficiency of the Collections Section and provided better service for customers.



● **AERIAL VIEW** of the expanded sewage treatment plant. Construction of new units, which increase plant capacity to 30 MGD, was completed in 1949.

The Public Works Director's office, which is the Administrative Division of the Public Works Department, is staffed by an Administrative Aide and a secretary. The 1952-53 budget for the Public Works Department is \$5,399,399, or 47.5 per cent of the total budget for the city.

By reducing the twelve independent departments to eight (later nine) divisions, all within a single department of Public Works, considerable overlapping and duplication were eliminated and a better degree of control and coordination of work was assured. The effect of the reorganization on the morale of the personnel of the divisions was excellent.

#### **Some Accomplishments**

**Airports.**—The major part of the \$5,000,000 airport development program has been completed. The new terminal building, costing \$860,000,

was placed in operation Sept. 1, 1952. Revenue from rentals and concessions in the new terminal for the remaining ten months of the fiscal year are estimated at \$98,702. The city will also receive a percentage of the gross profits from the rental car service and from taxi and limousine service originating at the airport.

**Water & Sewers.**—Flat rates for water service were discontinued, 4,000 such consumers being placed on meters. It is expected that this will reduce water wastage. An increase in water rates as of Sept. 1 of this year, is expected to increase gross revenue by \$490,000. During the past year, 3,000 new customers were added, making a total of 46,100 active accounts. The

past spring, voters approved a \$7,000,000 bond issue for expansion of the water system. The city is now making its own ferric sulfate from scrap iron, at a cost of \$28.50 per ton and using this for coagulation of Verde River water at a saving of about \$9,000 per year over alum. By sending out water bills on postcards instead of in 3-cent envelopes, several hundred dollars a month has been saved.

The expansion program for the water department includes a new pipe line from the Verde River filter plant, new storage reservoirs, and a new filter plant on the Arizona Canal.

**Traffic Engineering.**—Two additional off-street parking lots have been opened, handling 44 and 20 cars, respectively, and studies are being made to locate additional areas in the downtown area. The program of installing new reflectorized street name signs on all of the 1500 intersections in the city

is about completed. A systematic program has been put into effect for painting lines for traffic and pedestrian control. New traffic control lights have been installed at 14 intersections. All changes in installations for the regulation of traffic are made on the basis of engineering studies.

An extensive system of one-way streets has been inaugurated, and surveys show that traffic flow has been considerably improved. Initially opposed by merchants and motorists, the system now has their full support. In the current fiscal year, high priority will be given to street marking, purchase and installation of parking meters and the installation of traffic signals.

**Street Maintenance.**—In addition

other city departments. The costs of operating this division are distributed throughout all city departments served, based on the cost of work done.

**Transportation.**—In order to reduce operating costs by eliminating stops and lost time at the bus terminal, the terminal building was abandoned for transportation use, with a saving of \$16,389 in bus operation cost the first year. Buses now operate continuous routes without terminal layover. There are now 88 buses in operation. The average age of these buses is 5.1 years. Four new buses will be purchased during the current fiscal year.

For the benefit of both the city and its employees, a policy has been established of giving bus drivers,

more than \$20,000,000. The plumbing code has been revised to insure the use of improved materials and more modern plumbing methods. The electrical code is under revision and the Electrical Section is co-operating with the Arizona Public Service Co. in carrying out a 4-year program for modern street lighting which will cost \$1,300,000. This program is covered by a 20-year lease-purchase contract between the city and the Public Service Co. and will involve installation of 3,496 new street lighting units, or more if needed.

**Engineering.**—As a start toward the eventual solution of the problems of deferred street maintenance and the need for widening and improving main traffic arteries, steps are being taken to obtain Federal funds and establish improvement districts whereby four major paving projects may be undertaken. The cost for the four projects will be about \$930,000. In addition, \$30,000 will be spent for removal of bottlenecks, such as sharp corners and short narrow sections; and \$50,000 will be spent for drainage and rights-of-way. Where the city bears a portion of the costs of streets in improvement districts, aid in promotion will be available from a fund of \$50,000 sustaining a man on full time to promote such improvement districts on a sound engineering basis. Plans are under way for a new 60-ft. wide truck route extending from the eastern to the western limits of the city. This will cost about \$700,000 and will, in addition to giving trucks quick access to the industrial areas, provide a fast route for trucks through the city.

A policy has been adopted under which the city will pay for future extensions and enlargements of water lines into new areas. This eliminates one of the serious stum-

(Continued on page 89)



● **LANDFILL OPERATIONS** have replaced the former dump. Equipment used includes four tractors with bulldozers and a scraper to move cover material.

to street maintenance, this division is responsible for street cleaning and for garbage and refuse collection and disposal. A sanitary landfill has replaced the former dump. The budget of \$1,357,114 provides for replacement of some old trucks, and the purchase of 3 new trucks, a motor grader, a power shovel and an additional garbage collection unit. These are in addition to other units purchased recently.

**Mechanical Maintenance.**—Cost of operating city vehicles has been reduced through the establishment of a motor pool. All automotive repair work has been consolidated in one location through the construction of a \$44,000 addition to the central shops, eliminating duplication of equipment, parts and personnel. During the coming year, this division will prepare specifications for purchasing 7 pick-up and 14 heavy-duty trucks for the Public Works Department, plus numerous other equipment items for

who are laid off during the summer slack period, employment in other city departments which have seasonal jobs available. Thus the men are kept employed and are ready for bus driving in the fall without the expense of training new drivers.

**Building Inspections.**—Building permits for 1950 amounted to more than \$15,000,000; and for 1951 to



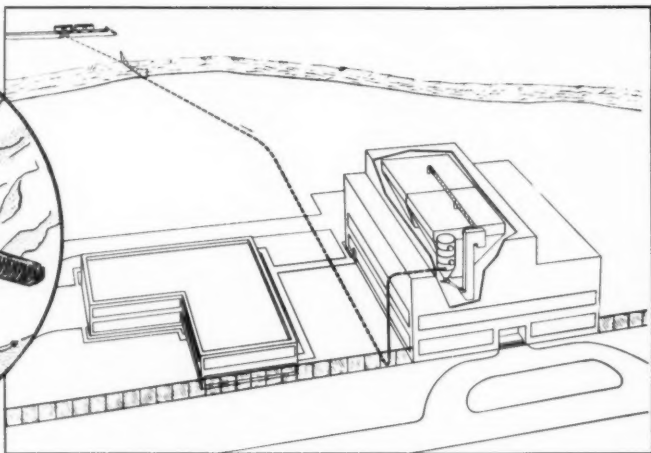
● **FINISHING TOUCHES** being applied to street name signs in the sign shop.



## Investigate Pneumatic Conveyors



**GEORGE N. HAVENS,**  
Chemical Engineer



● **BULK CHEMICALS** for water treatment at the Adrian, Mich., plant are unloaded from railroad cars and conveyed 1100 feet to the storage bin.

**F**OR handling bulk treatment chemicals, pneumatic conveyors possess numerous operating advantages which recommend their application by water and sewage plant engineers. The economic advantages which promote more efficient handling and savings in plant operations are:

1. Labor costs are reduced to an absolute minimum with highly automatic systems; one man operation is normal.

2. Operator and plant safety are assured as there are no motive equipment, no exposed moving parts and no hazards. Operator contact with dangerous or toxic materials is eliminated. Completely enclosed systems prevent dust from harming workers or equipment.

3. Material waste is prevented and plant cleaning and maintenance costs are minimized by complete dust control.

4. Savings in material costs are produced through bulk purchasing.

5. Low maintenance and major economies on upkeep result from simplified mechanical design and few moving parts.

6. Versatile handling and application flexibility are inherent in a pneumatic conveyor. Operating flexibility may be further increased

by integrating a pneumatic system with a mechanical conveyor.

### **The Engineering Approach**

The efficient handling of bulk treatment chemicals has always commanded serious attention from the operating management of water and sewage plants. With regard to capital investment and operating costs, their concern is well justified. Handling equipment is normally expected to last as long as the plant itself, so that advantages and disadvantages are acquired on a long-term basis.

It is fundamental that the processing operations in water and sewage plants will establish the requirements for the materials handling equipment. The governing factors which will outline the needed characteristics of such equipment include:

1. Water and sewage treatment plants must necessarily place great emphasis on economical operation. Handling equipment must provide savings wherever possible.

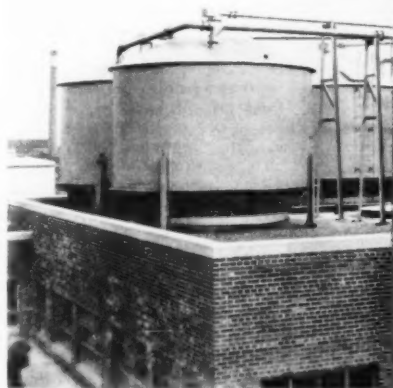
2. Dust from handling chemicals causes many problems. Suitable handling equipment must control this dust effectively.

3. Treatment chemicals may be received infrequently. Conveying

equipment must be capable of periodic or intermittent operation without cleaning or maintenance after each use.

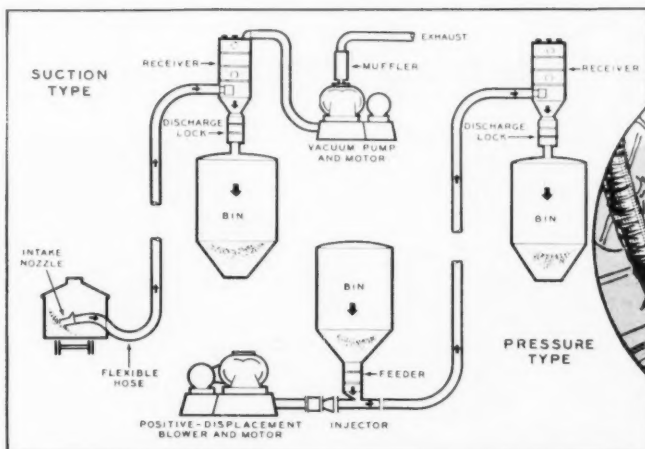
4. Since storage of large amounts of chemicals is normal, handling systems should be flexible enough to transfer materials from one bin to another or to a processing area.

5. Continuous 24-hour flow operation is standard. Handling equip-



● **PLACING** pneumatic conveyor distribution lines and storage tanks on

## for HANDLING BULK CHEMICALS



● BASIC TYPES of pneumatic conveyors. The component parts of the two systems are similar. Inset shows receiver with discharge hose leading to bins.

ment must supply continuous and thoroughly dependable service without failures or shut-downs.

6. Processing changes occur slowly. Handling systems tend to be permanent and must provide long service life.

Regardless of the size or location of the plant, these fundamental points command consideration when investigating methods for handling

chemicals for water treatment.

The method which best fulfills all these requirements is pneumatic conveying. This method furnishes dust-free, automatic materials handling in which bulk chemicals are transported swiftly and silently through completely enclosed, self-cleaning systems. Within its range of application, a pneumatic conveyor is superior to any other type of handling equipment. Reports from water and sewage plants which utilize pneumatic conveyors indicate exceptional operating efficiencies.

### How Pneumatic Conveyors Work

In pneumatic conveying, the flow of air supports the particles of material and transports them at high speeds between desired points. Materials may be either sucked or blown through the conveying lines.

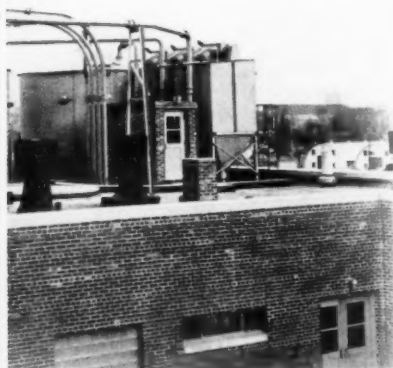
At the pick-up point, various types of mechanisms are available for introducing the material into the system at the correct air-material ratio. At the discharge point the air is separated from the material by a receiver (a specially designed combination cyclone and bag filter). Clean air is exhausted into atmosphere and the material is discharged to use or storage through air-tight mechanisms.

The two basic types of pneumatic conveyors are "suction" and "pressure"—derived from the manner in which the airstream is activated. The suction system employs the normal atmospheric air pressure as the driving force, while a pressure system uses mechanically created air pressure. These systems are used individually or in combination, depending on the application requirements. Frequently pneumatic systems are combined with types of mechanical conveyors to increase the flexibility of the system.

The pneumatic conveying systems of today can perform a multiplicity of bulk handling functions and can transport materials at rates up to 100 tons an hour. Unloading from transport, moving to storage, transferring from storage to processing, reclaiming materials (which might otherwise be wasted), mixing, weighing accurately, and batching can all be accomplished automatically with a pneumatic conveyor.

Pneumatic conveyors require little space. All that is needed is sufficient room and supports for a small diameter, standard steel pipe line. Pneumatic systems can be designed into existing plants and facilities with no trouble as the conveying line can follow complex paths. Walls, vertical heights, horizontal distances and floors present no obstacles.

(Continued on page 75)



roof cuts construction costs. Dust filter (right) exhausts tanks.



# Municipally Owned Equipment



● SOIL CEMENT BASE construction on a Union City street. Particular care is given to this phase of the work. Here water is added and the final mix is made.

**W. D. FRIZZELL,**  
Commissioner of Streets,  
Union City, Tenn.

**P**ROVIDING adequate streets is one of the most pressing problems municipalities face today. In recent years, material and labor costs have increased rapidly while available revenues have increased very little. Union City, as was the case with many other cities, did not build or resurface any streets during the war years. Moreover, similar inactivity existed in our other departments. Thus, at the close of the war there were so many immediate needs that it was difficult to decide which should receive top priority.

Street construction and maintenance was put aside in Union City in favor of a \$300,000 sewer extension program. Then the severe cold weather of 1949-50 completed the breakdown of our street system. In the spring of 1950, 19 miles of asphalt streets needed immediate resurfacing, and an additional 5 miles of new construction was deemed necessary. I realized that we should have a planned program if we were to accomplish the seemingly impossible. Using department personnel, we made a survey of Union City

traffic; and with the results of the survey before us, we outlined a four-year construction and improvement program designed to bring our streets to a satisfactory condition.

In the past, this city has followed the pattern of most municipalities whereby street improvements are made in that area which brings the greatest pressure on the City Commission. In planning our four-year program, we attempted to establish our work priorities in accordance with their importance as established by our survey, and not according to the pressures applied. To date, we have followed the program as originally outlined and we have found our citizens very cooperative in the execution of the program.

## Doing the Work

Contracts were let for the application of a seal coat to 19 miles of streets; and, in addition, for the application of 100 to 150 pounds per square yard of road mix to 40,000 sq. yds. of streets. By the time this work was under way, we had decided to purchase road equipment and use our own personnel for utili-

ties and street construction. I have never regretted this decision. We have constructed 17,247 lineal feet of curb and gutter at an average cost of \$1.20 per lineal foot, which compares favorably with costs in neighboring cities of \$1.75 to \$2.00 per lineal foot. We have built 6,866 ft. of 8-inch sanitary sewer at an average cost of \$1.77 per foot, as compared to a national average of about \$3.00 per ft. We have constructed over five miles of new streets, using our own men and rented equipment. We have not contracted any type of utility construction for over two years.

This year we have introduced a new type of street construction. We use a 6-inch soil cement base, with a double seal bituminous wearing surface. In my opinion, this type of construction is the answer to many of the street problems of small municipalities. The majority of surface failures can be traced to base failures, and it is for this reason that we have been seeking a better base. We have processed approximately 25,000 square yards of such base at an average cost of 49.7 cents per square yard.

The wearing surface costs about 30 cents a square yard; thus our total cost for sound street construction is 79.7 cents per square yard. Contractors' bids for this type of work for the state and for other cities range from a low of 70 cents per yard for the base alone to a high

of 90 cents. Thus we have saved more than 20 cents a square yard through the use of local personnel.

The equipment used on this work included: Two motor graders, a Galion 101 and a Caterpillar 112; one Seaman pulvi-mixer, D47, with D4 Caterpillar tractor; one R4

two graders and the tandem roller in 1950. All of the trucks have been owned by the city for some time and are old models. In 1952, we bought the Smith bulk cement spreader at a cost of \$1900; and the Seaman pulvi-mixer at a cost of \$5500. We rented the rubber-tired

## Reduces STREET COSTS!



● EQUIPMENT purchased for street construction work included this Seaman "Pulvi-Mixer", graders and tractors.

Caterpillar tractor, one Allis-Chalmers tractor; two water trucks, one pressure and one gravity; three cement trucks, 4-yd., dump type; one double-drum sheepfoot roller and Caterpillar D4 tractor; one Smith bulk cement spreader; one 13-wheel rubber-tired roller; one Farmall tractor; one Galion 3-5 ton tandem roller; and one Littleford asphalt distributor. We bought the

roller for \$136 per month. The County Highway Department loaned us the Allis-Chalmers tractor and the sheepfoot roller. All other equipment was purchased by the city prior to 1950.

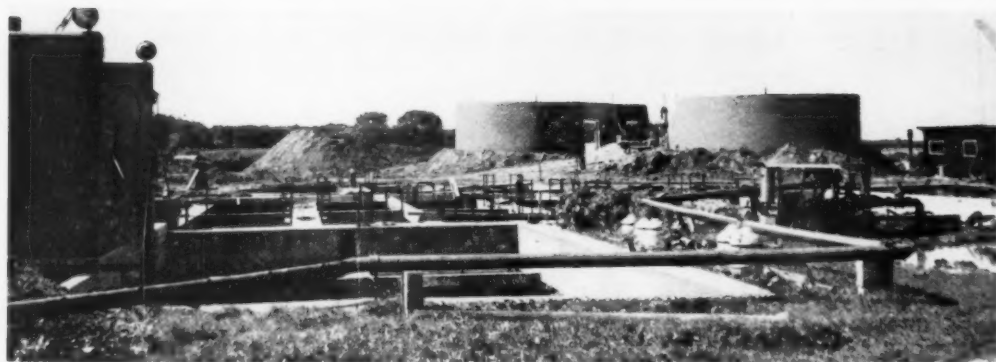
We have also established the policy that all sewer and water lines must be placed back of the curbs to eliminate the cutting of pave-

(Continued on page 66)

TABLE 1.—BREAKDOWN OF UNION CITY COSTS BY STREETS  
Data by courtesy of Town and City, publication of Tennessee Municipal League

	Mathews	Church	E. Main	S. 6th	Edwards	Bishop	Total
Sq. Yds. ....	4,317	4,044	1,867	2,763	1,568	7,104	21,663
Cement .....	1684.48	1368.64	613.70	873.64	485.13	2211.03	7236.62
Labor .....	429.28	237.97	144.38	155.33	109.06	511.09	1587.11
Fuel .....	23.24	22.82	5.60	22.68	24.92	55.02	154.28
Equipment Rental .....	259.45	242.64	112.01	165.77	94.28	426.22	1300.37
Curing .....	63.96	37.28	21.20	31.98	26.65	106.60	287.67
Manholes .....	—	—	5.55	11.80	3.75	22.00	43.10
Total Base .....	2460.41	1909.35	902.44	1261.20	743.79	3331.96	10609.65
Base Unit Cost .....	57.1	47.2	48.3	45.6	47.4	46.9	49.0
Surfacing Cost .....	690.72	662.78	298.72	442.08	250.88	1136.64	3481.82
Unit Cost .....	16.0	16.0	16.0	16.0	16.0	16.0	16.0
Total Unit Cost .....	73.1	63.2	64.3	61.6	63.4	62.9	65.0

\*Seaman mixer @ 5c per sq. yd.; cement spreader @ 1/2c per sq. yd.; rubber-tired roller @ 1/2c per sq. yd.



*Photos courtesy Pacific Flush-Tank Co.*

● **NEW CONSTRUCTION** at the Rochelle, Ill. plant. This view shows settling tanks and digesters with service building at left.

# Special Treatment for Industrial Wastes at a

**A. J. VAN BREDa,**  
Principal Sanitary Engineer,  
Sanitary Water Board of Illinois.

ONE of the most difficult industrial waste treatment and stream pollution problems in Illinois has at last been resolved. It is one which has harassed a municipality and plagued the Sanitary Water Board for many years. The City of Rochelle is presently completing the construction of additional facilities to permit effective treatment of two difficult industrial wastes along with its domestic sewage. These wastes, which result from wool scouring and from dyeing and bleaching of yarns and goods, have been a long-standing source of trouble.

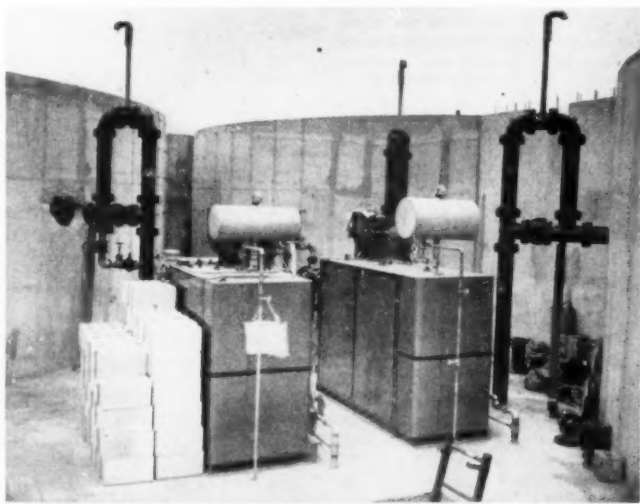
Rochelle, with a 1950 population of 5,449, is located in north central Illinois. Sewage treatment facilities, rebuilt in 1924, provided primary settling tanks, a sprinkling filter and a sludge digester converted from an old septic tank. In 1936, the works were enlarged and converted into a mechanical activated sludge plant. Included were a comminutor and auxiliary bar screen; a pre-aeration tank; two primary settling tanks; six mechanical aeration units; final settling tank; floating-cover digester; and service building.

It was almost immediately evident that the new plant would not

handle the wool scouring wastes effectively. The grease constituent could not be separated by pre-aeration and removed by skimming, as planned. As a result, grease was carried over into the aeration tanks, accumulating in and on the floc particles, and upsetting operation. The dye wastes caused no difficulty.

Much effort was expended by city personnel, by the various con-

sultants, and by the staff of the Sanitary Water Board in trying to develop satisfactory methods of handling the wool scouring wastes at the treatment plant. Numerous studies were made, and pre-treatment with various chemicals was tried on the combined domestic sewage and industrial wastes in an endeavor to provide an effective method of treatment by the plant.



● **DIGESTER** heating equipment and some piping have been located among digesters.



Although some of this work indicated possibilities of a satisfactory solution to the wool waste problem, chemical pre-treatment was very costly. The advent of the war halted the studies and during the war years the Rochelle sewage treatment works functioned routinely without the wool wastes, which were by-passed from the factory through a storm drain into Kyte Creek.

The demand for lanolin prompted the wool scouring industry, in 1943, to provide a means of separating this substance from their wastes. An extraction system was installed at the factory which removed the lanolin and also separated some other rather insoluble constituents from the wastes. However, attempts to treat these reduced wastes at the sewage treatment works proved to

### The Plot Thickens

With the termination of the war, interest in determining a solution to the industrial waste treatment and stream pollution problem of Rochelle was resumed. The industries expanded their production and increased the number of their employees, which prompted a demand for more housing in the town. The larger volume of wastes from the two adjacent industries exceeded the hydraulic capacity of the sanitary sewer serving that area. This required the by-passing of a major portion of the dye wastes in addition to the wool scouring wastes to a storm drain and into Kyte Creek. The increase in pollution of this stream resulted in more forceful demands for abatement action by the State Sanitary Water

sewage treatment works operations failed to indicate satisfactory means of effectively treating the combined sewage and wastes through the existing municipal plant. With some "prompting" by the Sanitary Water Board, the city retained consulting engineers to survey and report upon the situation and to determine a satisfactory solution to their problem. The changes and additions to the sewage treatment works which have been under construction since September, 1951, and are about to be completed result from this action by the city.

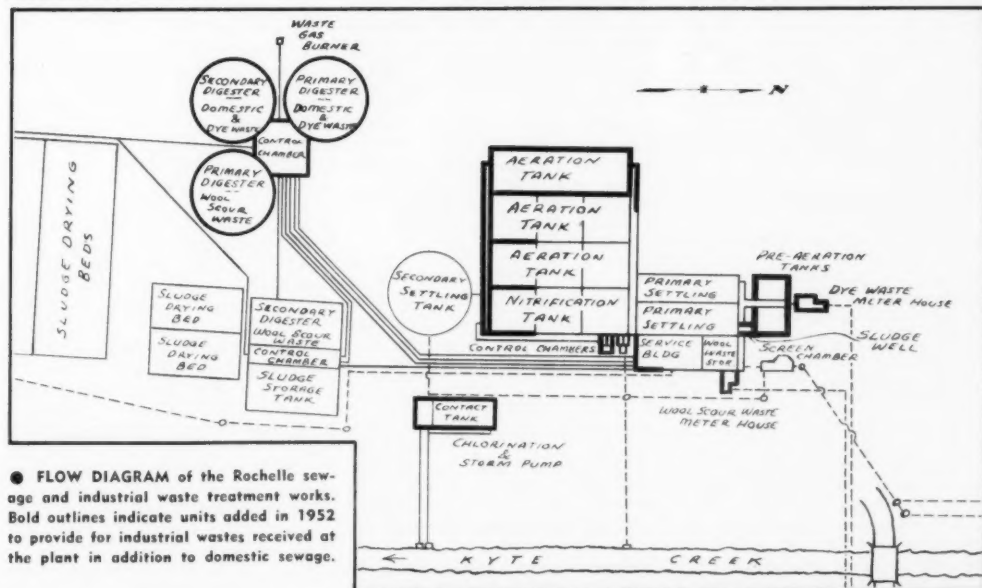
The previous adverse experience in trying to treat the wool scouring wastes by the activated sludge process indicated that some special means of handling them must be provided. A thorough study resulted in recommending stage anaerobic digestion for these wastes either separately or in combination with the domestic sewage and dye waste sludge, and the conversion to diffused air application of the activated sludge aeration units in order to increase the plant capacity. Substantial pre-aeration for the flocculation and coagulation of suspended solids to raise the efficiency of primary treatment was also recommended. A service charge system for financing the proposed new sewerage and treatment facilities was suggested and tentatively detailed.

The two industries retained consulting engineers to study and ad-

# CITY PLANT

be unsatisfactory since oils and greases other than the lanolin remained to cause trouble. Also, the extraction of the lanolin from the wastes quickly became uneconomical as so many other wool scouring industries installed extraction systems that the selling price dropped considerably. Therefore, the lanolin extraction system was discontinued.

Board. Investigations and surveys by representatives of the Board disclosed detrimental pollution of the creek, and the city was asked to take positive abatement action. Permits for the construction of sanitary sewer extensions within the community necessarily had to be denied. Further investigations and studies of the industrial wastes and the



vise on the proposal of the city's engineers, since under the service charge system suggested they would assume a considerable portion of the financial obligation for treatment plant construction and operation. This engineering firm concurred essentially in the proposed plan with the result that the industries agreed to cooperate in its execution. The detail construction plan documents were then developed and approved, and a Sanitary Water Board permit granted. Financing was arranged, bids received, and a contract for construction awarded.

### The Treatment Plan

The dyeing and wool scouring wastes will be carried to the municipal treatment works site in new, separate sewer systems each of which consists of pumping units, force mains and gravity sewers. Although both wastes are relatively warm when discharged from the adjacent industries, the separate sewers were planned and have been constructed to be intimately in contact throughout the approximately 2670 feet to the plant in order that the larger quantity of dye wastes may assist in maintaining the wool waste at sufficiently high temperatures during the winter months to prevent the coagulation and deposition of grease in the wool waste sewer. Means of introducing steam into the wool waste sewer system are also provided should such action be necessary to dissolve possible grease accumulations in the lines. Flow measurement and recording facilities are provided for each waste at the treatment works, which are designed on the bases shown in Table 1.

from the screen chamber. The volume of the pre-aeration tanks is such as to provide one hour aeration-detention for the combined sewage and dye waste design flow. Scum skimming troughs, which discharge into a new sludge well, are provided in these tanks. Fixed plate diffused air aeration equipment will supply 2 cfm through each of 24 plates per tank for an aeration rate of 96 cfm or 0.146 cu. ft. per gallon at design rate of combined sewage and dye waste flow.

The existing primary settling facilities consist of two rectangular mechanically cleaned tanks 14 feet wide by 48 feet long, with 8.5 feet effective water depth. These provide approximately 2.16 hours detention for the design combined sewage and dye waste flow. The surface settling rate at design flow will be 500 gallons per square foot per day. Although the weir overflow rate at design flow will be 24,000 gallons per foot per day, which rather greatly exceeds our present standard of "not to exceed 10,000 gallons per foot per day", there was no indication of past deficiency in operation of the units to justify supplying more weir length at this time. The tanks are provided with scum skimming troughs.

The plans provided for removing the mechanical aeration equipment from the existing six aeration units, which are 22 feet by 22 feet with 12 feet 8 inches effective water depth; and to construct aeration tank additions of approximately the same total volume. The aeration volume will therefore be doubled. The aeration facilities have been reconstructed and arranged to provide four channels which will be equipped with fixed plate diffusers.

process for the settled sewage and dye waste with the conditioned sludge. The three aeration channels will provide approximately 14.5 hours aeration or 42 cubic feet of air per pound of BOD per day, exclusive of return sludge. The sludge nitrification tank has a volume of about 17,500 cubic feet or 131,000 gallons. The 288 diffuser plates in the activated sludge aeration basins, discharging 4 cfm per plate, will supply 1152 cfm of air or 1,660,000 cubic feet per day to the mixed liquor. With an anticipated load of 1284 pounds of BOD per day into the activated sludge aeration tanks with the settled sewage and dye wastes, exclusive of the return activated and conditioned nitrified sludge, approximately 1300 cubic feet of air per pound BOD will be supplied. The design of the aeration equipment provides for about 384 cfm of air to be applied in the sludge nitrification basin. The plans provide for complete, flexible control of return activated, and conditioned sludge, with the flow rates being metered and recorded. Complete control, metering and recording of the air supply to the various units is also provided.

The existing final settling tank, a 40-foot diameter unit with effective water depth of 7 feet 3 inches and with mechanical sludge collecting equipment, will be retained with no change. This unit will provide 2.43 hours detention at design flow with a surface settling rate of 533 gallons per square foot per day. The weir overflow rate in this tank will be 5,330 gallons per foot per day.

Although it is expected that the new treatment works will provide sufficient treatment to produce a satisfactory final effluent at all times, sufficient to prevent pollution of Kyte Creek, chlorination facilities have been provided as an added safety measure. It was felt that during extremely low flow periods, the BOD remaining in the effluent might cause some pollution of the stream. Chlorination of the effluent at such times would serve to oxidize some of the BOD and to "pickle" the remainder until dilution is available at Rock River, a relatively large stream nineteen creek miles below Rochelle. A 12-foot by 30-foot tank, with 6-foot water depth, will provide 35 minutes contact for the plant effluent. The 200-pound per day chlorinator will be capable of feeding 36 ppm of chlorine. A 1500-gpm storm pump

(Continued on page 78)

Table 1.—Design Bases for Treatment

	Domestic Sewage	Dye Wastes	Wool Wastes
Flow g.p.d.	390,000	280,000	25,000
Hours per day	24	12	14
Rate gpm	270	390	30
Suspended Solids ppm	350	500	12,000
BOD, ppm	330	460	15,000
BOD lbs./day	1070	1070	3100
Population Equivalent	6400	6400	18,600

The former pre-aeration tank will function as a wool scouring waste receiving and holding basin. The dyeing wastes will discharge into an influent channel between two new pre-aeration units, which may also receive the domestic sewage flow

It is intended that one channel will be employed for the Krause-PFT process for sludge conditioning and nitrification; and that the remaining three channels will be utilized for the standard or modified activated sludge treatment

# CONSERVATION

## and The Public Works Engineer

**EDMUND A. PRATT,**

Consultant, Conservation Division,  
Defense Production Administration

**C**ONSERVATION, like engineering, is an art based on the application of the natural sciences. Its object is the efficient utilization of the materials and forces of nature, whether in the forms in which these occur in nature or in new forms resulting from physical or chemical conversion.

Conservation embraces more than mere reclamation and salvage, and is accomplished through a variety of procedures, such as the substitution of readily available materials for those which are scarce; the more effective utilization, handling and control of materials; development of improved designs and manufacturing methods; new or revised standards, specifications and codes; elimination of unnecessary varieties of products or their components; and improvements in management and operation to avoid wasteful practices.

Public works engineers have felt the effects of conservation. They have been made painfully conscious of shortages of steel, copper, aluminum and other materials, and have had to utilize substitutes. But there is open to these engineers a much larger field of action in furthering the conservation movement, and in the adoption of conservation principles as permanent factors in their daily work. Not only will this serve the national interests of the moment, but it will also permanently enhance the effectiveness and economy of the engineers' achievements.

Perhaps the most spectacular recent examples of conservation are in the fields of metallurgy, chemistry and allied sciences. Research in the field of alloy steels has resulted in large savings of scarce nickel by the addition of minute quantities of boron. In the field of electrical communications aluminum has been extensively substituted for copper for conductors. In the same field, substantial quantities of lead have been conserved by the use

of polyethylene plastic for cable sheathing.

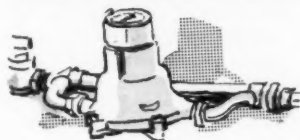
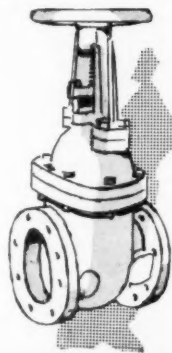
Other notable examples of conservation include the substitution of laminated wood structural members for heavy solid members, or even for structural steel; and the

and wood products, and miscellaneous), into three groups, according to whether they are in short supply, in approximate balance, or in fair to good supply. Each issue of the list is revised in the light of changing conditions. This list is obtainable without charge from the Printing Services, Department of Commerce, Washington 25, D. C., or from any Department of Commerce Regional or District Office.

### Municipal Conservation

Among the branches of municipal engineering in which conservation is highly important are water supply and sewerage. Not only is the conservation of water important—in some places imperative—but its conservation is accompanied by savings in many directions. A water works plant with its distribution system contains a great variety, and large quantities, of materials which are at times in very short supply. Pipe lines and storage tanks may be of steel plates or reinforced concrete using an equivalent amount of steel. Treatment plants utilize steel in their structures and have a multitude of valves, control devices, and chemical handling and other equipment containing a large amount of copper or copper-base alloys, and other corrosion resistant materials. Pumping stations have electrical machinery, control apparatus and transmission lines in which copper is an essential element. The great number of valves of many sizes in the water distribution system all have brass or bronze parts containing high percentages of copper. Substantial quantities of chemicals (e.g., chlorine) are used in the purification of water and treatment of sewage. In the same measure that water is unnecessarily collected, processed and distributed, all these valuable materials are wasted. And the loss is magnified when the excess water has again to be treated and disposed of as sewage.

Where electric power is used for pumping, this energy—already in "short supply" in some regions—is wasted, too, by the excessive and unnecessary use of water.



use of clad metal in place of solid alloys for protection against corrosion.

As an aid to the designer or user a "List of Basic Materials and Alternates" is issued bi-monthly by the Conservation Division of the Defense Production Administration. This list is designed to reflect the relative availability of some 400 basic materials, and to conserve critical materials by indicating the more readily available alternates. Materials are segregated within their appropriate commodity classifications (metals, chemicals, lumber

### Scarce Materials Requirements Per MGD

Some idea of the relative quantity of materials lost through wastage of water may be gained from figures derived from the requirements of "controlled materials" (i.e., steel, copper and aluminum under the Controlled Materials Plan) reported to the National Production Authority. These "requirements" indicate that for each million gallons per day plant capacity 300 to 400 tons of carbon steel and 5000 to 6000 lbs. of copper or copper-base alloys are needed.

In addition to the "controlled" materials, there are manufactured products, such as valves, in which such materials are used, and which enter extensively into water works systems. The 8-inch valve of a well-known manufacturer contains 17.3 lbs. of copper-base alloys; a 6-inch valve has 10.7 lbs. of the same materials. Recently published data on 40 medium-sized water works plants indicated that from 235 to 260 valves of various sizes are installed per mgd system capacity. Taking the 8-inch valve as an average, there would be something like 4000 to 5000 lbs. of copper-base alloys in valves alone, per mgd capacity.

However substantial these figures may seem, they are greatly exceeded by the amount of copper in service connections, especially where copper tubing is required by local regulations. Analysis of demand, population and number of service connections for 72 cities for which recent figures are available shows an average per capita demand of 111 gpd and 520 gpd per service (after elimination of 12 cities with heavy industrial demand). If 45 lbs. of copper tubing are allowed per service (as was the case under NPA Order M-100 during the period of copper scarcity) the requirement of copper for service connections alone, per mgd capacity, would be 86,600 lbs. Under current NPA regulations the allowances for copper and copper-base alloys are much more liberal.

Putting these figures together and ignoring meters (a substantial item, incidentally), electrical machinery and other items containing copper, it is evident that each million gallons per day of plant capacity involves the use of something like 100,000 lbs. of copper and copper-base alloys.

Since it is a matter of common knowledge that the demand of an

unmetered service is likely to average as much as 50 per cent more than it would be if the service were metered, it can be seen that full metering (as compared with no metering) should conserve a substantial quantity of materials which are sometimes in very short supply.

Various other means are open to the water works engineer to conserve critical materials as well as water. Hidden leaks sometimes account for large quantities of water running to waste. The detection and correction of such leaks may very well obviate or postpone the necessity for plant extensions, thus contributing to the conservation of critical materials. Pump efficiency tests may disclose very low "wire to water" efficiency, the correction of which will conserve electrical energy and the scarce materials needed for its generation and use. Obviously, all improvements in operating efficiency produce similar results.

Thus the water works superintendent can play a very important role in the conservation of many materials urgently needed for defense and the maintenance of civilian production. Another way in which he can collaborate importantly is by accepting the substitution of different materials for those to which he is traditionally accustomed—always assuming that the quality of his work is not adversely affected. For instance, the figures given above indicate how important it may be to substitute plastic for copper tubing in cold water service connections, in the event of a serious copper shortage recurring.

### Conservation in Building Construction

The work of municipal engineers embraces such a wide field that it is possible here to touch on only a few of them. Among these, building design, construction and maintenance are not only important, but hold the advantage of having recently been subjects of study by a highly qualified group—the Building Research Advisory Board (BRAB) of the National Research Council—aided by advisory panels and technical advisory groups covering eight major fields of building technology. The study was conducted under a contract administered by the Conservation Division of the Defense Production Administration. The report was issued by BRAB on June 30, 1952 under the title "Study of Conservation in

Building Construction." This publication may be obtained from the Office of Technical Services, Department of Commerce, Washington 25, D. C. (Price \$3.50.)

The BRAB study enumerates the principal means of achieving conservation in the building fields under four main headings: Alternate Materials and Methods; Standards, Specifications and Codes; Technical Practices; and Administrative and Professional Practices. The object of conservation is conceived as "maximum efficiency in the use of money, manpower, and materials." Under normal conditions this is achieved through design for lowest annual cost; during periods of shortages conservation of materials is to be achieved through judicious allocation and use of the available supply on the basis of essentiality in different parts of the structure.

It is important to note, in connection with substitute and alternate materials and methods, that "expediency" is not conservation; in fact, the use of "expedient" substitutes may result in ultimate waste of materials and manpower. The use of such substitutes should be restricted to periods of extreme emergency, and to temporary structures. Acceptable permanent substitutes should be qualified to meet the essential requirements of long-term conservation.

There is a long list of possible substitutes for building materials, including those permissible primarily in times of national emergency. The BRAB Advisory Group on Building Envelope and Interior lists, among other items, non-metal alternates for metal windows and window screens, metal doors and frames, and metal office and toilet partitions. The Advisory Panel on Electrical Systems suggests the consideration of aluminum for both primary and secondary distribution circuits, the use of non-leaded cables for primary distribution circuits both under ground and in raceways, non-metallic materials where practicable for raceways, lighting fixtures, face plates, etc., and a variety of other substitutions. (This may suggest to the municipal engineer similar substitutions in electrical systems for which he is responsible, e.g., traffic control and airports). The Advisory Panel on Plumbing recommends non-metallic pipe for house sewer connections except where cast iron soil pipe is required; black instead of galvanized. (Continued on page 98)



## How to Correct SLICK SPOTS

GEORGE E. MARTIN

FOR various reasons slick spots or fat spots may appear on the surface of bituminous pavements. When these occur they may range from merely a bad appearance to a slippery condition causing a traffic hazard. In some cases the pavement may push or shove due to the excess bitumen.

Areas with excess asphalt on the surface appeared recently on a section of U. S. Highway 9 W just across the Hudson River from Poughkeepsie, N. Y. The pavement is a three-course one, consisting of two binder courses and one top course, over an old concrete road. The slick spots were of considerable extent. While tests made with an automobile, in wet weather, showed they were not slippery, they did look bad. It was decided, therefore, to try to remove or correct them.

The attempt to scrape off the excess asphalt with ice removing hand tools was not successful, because the asphalt coating was very thin. Blow torches were used to heat the pavement prior to the use of the scrapers.

The next move was to cover the slick areas with hot stone. Broken

stone, ranging in size from one-quarter to one-eighth inch (New York State 1 A), was heated to from 250° to 300°F. in a bituminous concrete mixing plant, and hauled about eight miles by trucks to the job. Two blow torches were used to heat the pavement surface and the hot asphalt was covered immediately with a layer of the hot stone. A small roller was used to imbed the stone in the asphalt.

The results were fairly successful. However, not all of the stone cover was held in the surface under traffic, some being thrown to the side of the road. Also the patch was white instead of black like the remainder of the pavement.

To correct these conditions the cover stone was coated with 85 to 100 penetration asphalt at the same mixing plant, using 1½ per cent, 1¼ per cent and 1 per cent by weight. The mix using 1¼ per cent seemed to work the best. The blow torches were used to heat the pavement and warm the asphalt coated stone. The secret of success seems to be to spread the coated stone immediately behind the blow torches in a thin layer, and roll it in place at once. The added coated stone eliminated the slick appearance of the rich areas, and it held in place much better under traffic than the uncoated stone. The corrected sections more nearly approached the appearance of the remainder of the pavement. It is believed that the wear of traffic will make the patches even less conspicuous.

This work was done under the direction of K. G. Rauer, Assistant District Engineer, District No. 8, New York State Department of Public Works.



● EFFECTIVE TREATMENT of slick spots was accomplished by heating the pavement with blow torches and immediately applying hot coated stone and rolling.

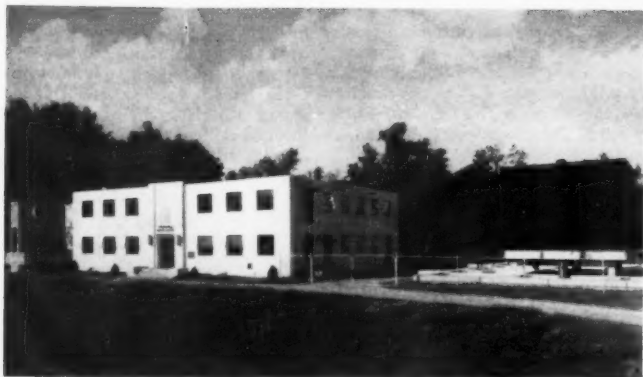


● AREAS TREATED with coated stone blend with the remainder of the pavement. Procedure is described above.



● CONSPICUOUS white patches result when stone is not coated with asphalt before spreading on slick spots.





● WATER TREATMENT PLANT at Springfield, Tenn. From left to right, units shown are transformer bank, main building, settling basin and coke tray aerator.

## TURBIDITY and ODOR PROBLEMS overcome in FILTER PLANT DESIGN

**J. WILEY FINNEY, JR.**

Ass't. Director, Division of Sanitary  
Engrg., Tennessee Department of  
Public Health

**A**N antiquated water plant, built nearly thirty years previously, whose capacity was stretched to the limit, was a principal post-war problem of Springfield, Tenn. Designed to treat 0.77 mgd, the plant was being operated at a rate of 1 mgd to meet the needs of the estimated 7,000 population served. A thorough engineering study was initiated. When this was completed, about the middle of 1946, it was shown that not only was the plant inadequate in capacity, but also that the concrete structures were in an advanced stage of disintegration, and in dan-

ger of failure. The elevated storage of 300,000 gals. was inadequate; and distribution main extension and replacements were badly needed to serve expanding residential areas.

Although consideration was given to the renovation and enlargement of the existing plant, this was deemed impractical and the engineers recommended a new plant to be located on Sulfur Fork Creek from which the supply was to be taken. In accordance with the recommendations of the engineers, a new filtration plant, with a capacity of 2.3 mgd was constructed, with completion during 1950.

Sulfur Fork Creek is subject to wide variation in turbidity, due to runoff from adjacent cultivated fields; and, during low flow periods in the late summer and fall, there



● INLET and outlet troughs and sloping baffles in settling basin.

are heavy algae growths which present problems in taste and odor control. Treatment facilities provide aeration, coagulation, sedimentation and filtration, with both pre- and post-chlorination. Certain features of the plant represent excellent design practice, which should be of interest to many waterworks men, especially since operating experience over the past two years has shown the design to be sound.

One of the reasons for the selection of the plant site on Sulfur Fork Creek was the possibility of locating the raw water pumps and the high service pumps in the same room at such a level as to provide a positive head on both sets of pumps, thereby eliminating the necessity of priming. To provide suction for the low lift pumps a concrete weir dam was constructed with an intake structure at the creek bank. The intake structure contains the following features: (1) A 24-inch sluice gate for blowing off sediment and leaf concentrations from behind the dam. (2) An 18-inch inlet valve into the intake screen chamber. (3) A removable leaf and trash screen. (4) A pump suction well on the downstream side of the leaf and trash screen.

Aeration for odor control and carbon dioxide reduction if needed, is provided by a coke tray aerator located on top of the sedimentation basin. The aerator consists of a perforated distribution pan and four



● **FILTER OPERATING FLOOR** houses four rapid sand filters of 400 gpm capacity each. Rate control is by valves actuated by floats in illuminated sight wells.

coke trays. Valves and piping provide for by-passing the raw water directly to the flash mixer if desired.

#### Chemical Feed Equipment

Alum and lime for coagulation are fed by two Wallace and Tiernan, type MOF, dry feeders. Alum solution is applied to the water as it enters the flash mixer and lime may be applied at the same point or to the water entering the flocculation basin. A similar dry feed machine for activated carbon is located in a separate room over the outlet end of the flocculation basin. Carbon may be applied to the water just prior to leaving the flocculation basin or may be added to the water in the filter influent header.

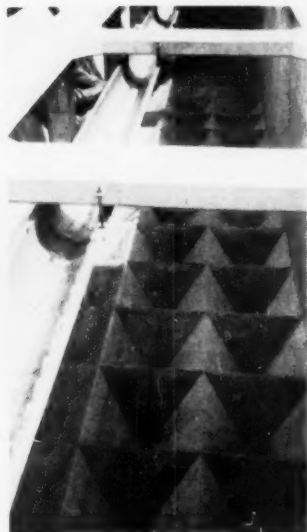
Adequate storage space for chemicals in greater than carload lots is provided in two separate storage rooms on the floor above the feeders. All dry feeders are equipped with extension hoppers which are filled from the chemical storage rooms. Hoisting of the chemicals in bags from truck bed to chemical storage

floor is accomplished by a four wheel cart and an electric hoist mounted on a hoist beam under the storage room ceiling and extending outside over the driveway.

Two Wallace and Tiernan visible vacuum type chlorinators are located in a separate room, with an outside door only, to preclude the escape of gas to other parts of the plant. The pre-chlorinator has a maximum capacity of 200 pounds per day and the post-chlorinator capacity is 30 pounds per day. A ventilating fan with automatic shutter discharges to the outside.

#### Mixing and Flocculation

The flash mixer and flocculation basins are located under the chemical feed room floor in the plant and provide a detention of five minutes and thirty minutes at plant rate respectively. Rapid agitation is provided by a vertical shaft mixer with three sets of 18-inch diameter impellers having three blades per set. Raw water enters the flash mixer near the bottom and leaves the basin



● **CLOSEUP of hoppers for sludge collection** in settling basins.

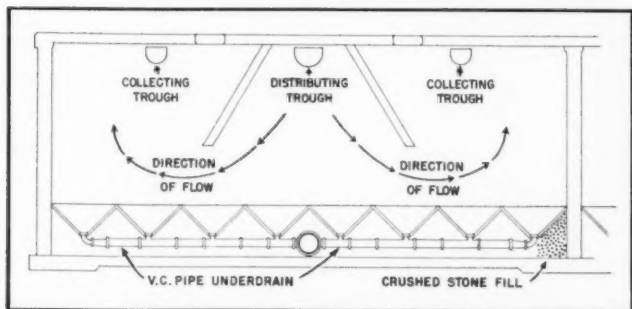
over a submerged weir wall on the opposite side. Slow mixing is provided by two vertical shaft paddle type units driven by electric motors through variable speed reduction gears. The peripheral velocity of the paddles is adjustable between 0.6 and 2.4 feet per second and the mixers rotate in opposite directions to reduce the possibility of short-circuiting the basin.

Facilities for periodic desludging of both the quick mix and flocculating basins are provided by means of an underdrain pipe system over which is constructed a false bottom forming a series of inverted pyramidal cells each apex being connected to a 4-inch pipe inlet into the pipe underdrain system. The side walls of the cells have a slope of about 45 degrees and are given a slick finish to facilitate sludge removal. The underdrain system is terminated by a gate valve in a manhole outside the flocculation basin, one wall of which is common to the basin. Desludging is accomplished by rapidly opening the gate valve on the underdrain line. The head of water in the basins forces the sludge from the hoppers through the underdrains to the plant sewer.

#### Sedimentation Basin

The sedimentation basin is constructed in two sections, designed for parallel operation, and provides a

(Continued on page 96)



● **SECTION THROUGH** one-half of sedimentation basin, showing arrangement of distributing and collecting troughs, baffles and sludge collecting system.

# Six Pumps

# Deliver 2,100,000

**C. J. TULLO,**  
Worthington Corporation

SIX 84-inch Worthington pumps, each driven by a 22,500-hp motor, deliver a total of 2,100,000 gallons per minute against a head of 197 ft. at the Tracy pumping plant of the Central Valley Project. The Sacramento Valley gets two-thirds of the rainfall of this great central region of California, but the San Joaquin Valley has two-thirds of the arable land. This project transfers needed water from one river basin to another. The essential factor in this transfer is the Tracy pumping plant. Its design is an important engineering advance.

The Tracy plant takes Sacramento River water and raises it 197 ft. to the Delta Mendota Canal, which transports it south 117 miles by gravity. Near Mendota, the canal discharges into the San Joaquin River, replacing water diverted from that river by the Friant dam and used for irrigation purposes.

Each of these pumping units has a trash rack at the inlet and a

gate for dewatering purposes, with a shutoff valve in each pump discharge line. The discharge lines from each of three pairs of pumps connect through a Y-branch to a 15-ft. diameter pipe which extends about 4,700 ft. to the canal. Starting and stopping are under manual control. The pumps are generally

Each main pump has two lubricating oil pumps, one driven with an AC motor and one with a DC motor. Normally only the AC pump is in operation, but the lubricating oil lines are interlocked so that in the event of an AC lubricating oil pump failure or of a pressure drop below predetermined setting, the

started with the pump casings full of water, the intake gates open and the valves to the discharge lines closed. When the units have been synchronized and adjusted for operation, the discharge valve is slowly opened.

## Pumps and Motors

The six Worthington pumps are vertical centrifugal, single suction, single stage, twin volute type. Each pump, exclusive of motor, weighs about 178 tons. Each pump is driven by a 22,500-hp, 180-rpm Allis-Chalmers vertical synchronous motor. Indicating the size of the installation, the motors are 34 ft. 3 ins. above the center line of the pump casings. The distance from the center line of the casing to the face of the pump discharge flange is 16 ft. 9 ins. The shaft diameter at the bearing journal is 20 ins. The cast iron suction elbow is 76 ins. in diameter at the upper end, changing gradually to an elliptical section to match the concrete section of the suction conduit. At this point, the opening is 91 ins. high by 168 ins. wide.

DC unit will automatically start supplying oil to the bearing.

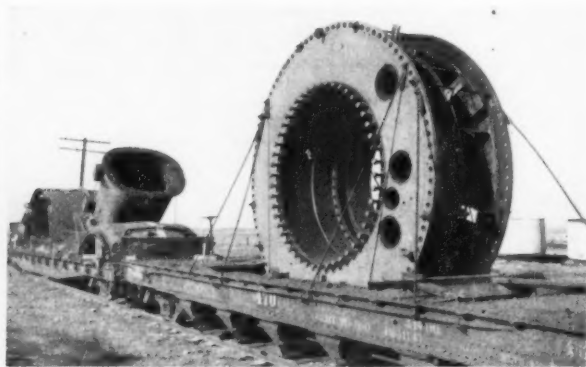
## Pump Design and Problems

The casings are made in five sections to facilitate handling and manufacture. The casing castings were made of 50,000 psi tensile strength cast iron. The hydraulic radial forces were kept to a minimum by making the casings of the twin volute design. The casing spiral is constructed with an integrally cast circular rib, 160 inches in diameter on each side; and in addition, it is provided with 19 radial ribs along its outer perimeter in order to provide stiffness and to keep the stresses within the limitations of the Bureau of Reclamation Specifications.

The casing sections were designed so that the physical dimensions would permit transportation across the country by rail from Harrison, N. J., to the pumping plant site in California. The weight of the largest section of the casing is 27,000 lbs., and the weight of the complete casing is 130,000 pounds. The overall dimensions of the casing are ap-



● THE FIRST of six impellers, shown in the shop after cleaning and machining.



● SECTIONS OF pump casing, upper and lower covers and pit liner and casing mounted on railroad cars for shipment.

proximately 28 feet by 22 feet, and at its greatest depth is 8 feet.

Due to their size, the casings required some very unusual machine shop procedure. The boring and facing for the upper and lower covers or heads were done at one setting on a Bethlehem horizontal boring and milling machine carrying

The suction elbow was also made of 50,000 psi tensile strength cast iron. Each elbow consisted of three sections so that the physical dimensions permitted transportation by rail. The flanges of each section were faced and drilled and the three sections bolted together to form a 90° bend. The weight of each com-

ganese bronze and after machining weighed 37,000 pounds each.

The impellers were made in an assembled mold in order to shape accurately the seven intricately contoured vanes. The core boxes were constructed and dimensioned to produce the individual sections of the mold. Setting of the cores

## GALLONS PER MINUTE

two cutting tools for equalizing the stresses.

After the casing flanges were machined, the sections were assembled to be certain that metal to metal contact and accurate alignment were obtained. The casing was then reassembled for the hydrostatic test with gaskets made of canvas and red lead between the joints. High tensile strength steel bolting was used for all the casing joints and a layout by template was made to secure uniformity of the drilling in all six casings.

The casings were subjected to a hydrostatic test pressure of 165 psi for a duration of three hours in order to determine freedom from porosity or other casting defects. During these tests, deflection measurements at critical points were taken and tabulated for each casing. The hydrostatic and deflection tests were again repeated at the destination after the casing was assembled in position and just prior to enveloping it in concrete. Special bulkheads and steel plates were made up for the purpose of conducting this test.

pletely assembled suction elbow was approximately 50,000 pounds. The assembled elbows were also given hydrostatic tests in the shop and again at the destination after assembly into position and before enveloping them in concrete.

The patterns and core boxes for the casings and suction elbows were made of wood and were of the full solid type construction. The casing consisted of five patterns and forty-one core boxes while the suction elbow consisted of three patterns and ten core boxes.

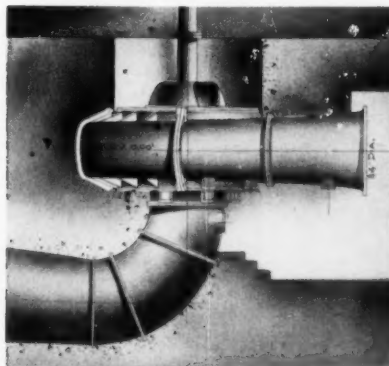
The casing covers, both upper and lower, were fabricated from steel plates. The completed weldments were about 12½ feet in diameter by 2 feet deep and the finished weight of each cover was about 20,000 pounds. The weldment had many stiffening struts and each cover required more than six hundred linear feet of welding. The machining for this part was done on a large heavy duty vertical 20 foot Niles boring mill.

For these pumps, the impellers are 145 inches diameter. They are made of high tensile strength man-

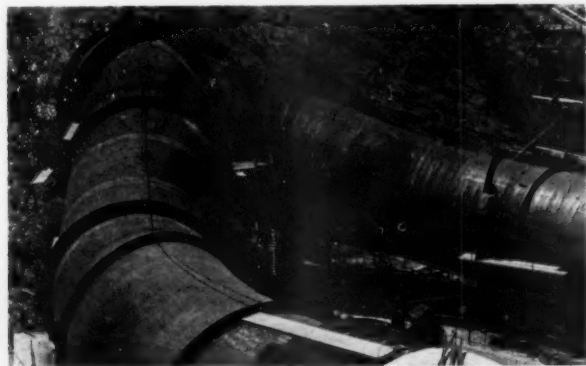
ganese bronze and after machining weighed 37,000 pounds each. The impellers were made in an assembled mold in order to shape accurately the seven intricately contoured vanes. The core boxes were constructed and dimensioned to produce the individual sections of the mold. Setting of the cores

required painstaking procedures as the vanes are each about 12 feet long, leading from an inside cavity and gradually decreasing in curvature outwardly towards the rim. Approximately 80,000 pounds of metal was poured in order to fill all the cavities in the mold including the risers. Enormous weights were required to hold the mold in place as the metal was poured. In order to obtain the highest possible efficiency, all surfaces of the impeller including the vanes were given a high polish. Hand operation requiring many man hours of patient and skilled work were needed to do this. To insure an accurate static balance extreme caution was used to center the eye or inlet of impeller with respect to the vanes prior to machining. It was also necessary to provide an accurately ground arbor with carefully machined flanges to fit the 22-inch diameter shaft bore. A precision set of rollers were provided on which the mass could rotate freely while supported on the arbor. By the addition of weights to the

(Continued on page 90)



● ARTIST'S view shows elevation of the 84" vertical volute pump as installed.



● MASSIVE WYE connection in discharge line from the pumps. Water is carried about one mile through pipes to the canal.

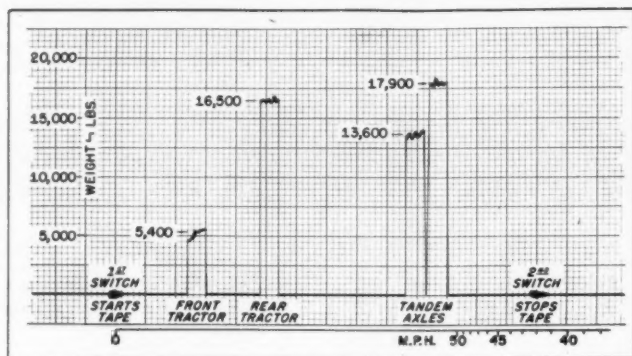


# TRUCKS WEIGHED AT 50 MILES PER HOUR

**A** NEW electronic instrument measures the weight of motor trucks as they roll down the highway at normal speeds. The device consists of (a) an unobtrusive platform located right in the highway lane, (b) four electronic load cells that support the platform, and (c) a remote indicator that provides a continuous record of axle weights on a tape. Furthermore from this same tape, axle spacings and vehicle speeds may be easily computed. Road tubes ahead and beyond the platform automatically start and stop the equipment as each truck traverses the platform. At a speed of 50 miles per hour the trucks are on the platform only 1/30th of a second.

This Model TR-1 Electronic Highway Research Unit will play an important part in future highway planning and research studies. Placement of the unit in test road sections will furnish a 100% record of axle weights, speeds and axle spacings in any given period. Heretofore this information was gained by stopping a relatively small number of trucks and manually weighing the axles. The frequencies of loads over the road being surveyed were then estimated. The procedure was tedious, expensive, and the results questionable at best.

Installation of the platform and electronic equipment is relatively inexpensive. It requires a recessed platform 3 ft. x 10 ft. in size and a shallow pit to house the electronic



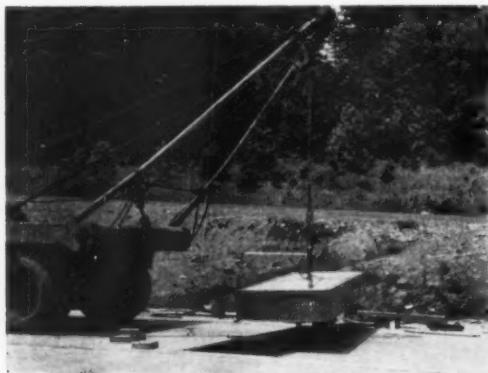
● SECTION of recording tape in truck weighing unit shows how weight is indicated for each axle of a moving vehicle. Speed and axle spacing are also recorded.

weighing cell units on which the platform rests. These weighing cells are but 6 inches in height. Both the platform and pit walls are of standard reinforced concrete construction. Electric cables lead from the weighing cells to the indicator and recorder which may be remotely located from the platform site for greater convenience.

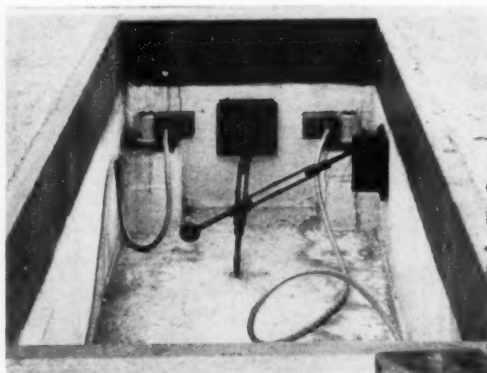
An attachment to this unit, also developed by Cox & Stevens Aircraft Corporation, will detect overloaded axles irrespective of vehicle velocity. The unit may be set to the legal load limit for either single or tandem axles and all vehicles with loadings beyond the limits will cause a bell to ring or will automatically signal the truck into a

weighing station. The Detector Unit will reduce weighing station traffic tremendously since it will cull out of normal traffic only those vehicles that are overloaded and will allow all legally loaded trucks to proceed uninterrupted. The use of Detectors and Electronic Scales will incur many savings in weighing station operation due to a possible 90% reduction in the number of weighings daily. Shorter entrance lanes, less parking area, and fewer station personnel contribute to the reduced cost.

The Model TR-1, the Overload Detector, and Electronic Static scales have been under test at the Bureau of Public Roads for over 18 months.



● LOWERING the concrete platform onto the weighing cells in the pit. This particular platform is 12" thick.



● WEIGHING CELLS are located at corners of pit. Tie rods prevent horizontal movement of the platform.





## TACOMA TREATMENT PLANT reduces PUGET SOUND POLLUTION

**C**OMPLETED earlier this year, the new sewage treatment plant built along the Puyallup River will provide primary treatment for the sewage from some 100,000 people, two-thirds of Tacoma's population. According to Commissioner J. S. Roberts, under whose initiative the plant was built, it is the finest and most modern sewage treatment installation on the Pacific coast and the largest yet constructed in the state of Washington. Designed by the Office of Clyde C. Kennedy, consulting engineer of San Francisco, the plant can handle 27 mgd of domestic sewage and up to 42 mgd of storm flow.

Financing of the plant, and of additions to the sewer system, was authorized in a 1944 election at which time a bond issue of \$3,000,000 was approved. The contract for the construction of this plant was awarded in late 1950 to the Hoagland-Findley Engineering Co. of Seattle and San Francisco on a bid of \$1,327,000. It is the first and largest of several plants which will treat all of the

A. R. MacPHERSON

sewage of Tacoma. The others will take the sewage flows from the northern areas of the city, which cannot be economically handled by the present plant and which still discharge sewage into the waters of Puget Sound. These future plants will be financed by the sewer service charge of 75 cents a month which is now in effect.

In order to connect the new plant with the main trunk line sewers serving the south end of the city, it was necessary to lay about 6,000 ft. of 48-inch concrete pipe. This portion of the job was carried out under contract by Construction Engineers and Contractors of Tacoma, at a cost of \$370,000. A Thew dragline and crane was utilized to dig a trench about 8 ft. deep in the soft, sandy soil. The reinforced concrete pipes were supplied by Greystone Products Co. of Seattle. A Bucyrus-

Erie boom crane was used for placing the pipe into the trench; and filling was accomplished with two TD-6 International tractors equipped with bulldozers. One other sewer, 27 ins. in size, enters the disposal plant area. This line serves an adjacent residential area.

### The Treatment Plant

The sewage enters the plant through two Parshall flumes which are provided with metering equipment. Preliminary treatment equipment includes a mechanically cleaned Link Belt screen with bars spaced  $\frac{3}{4}$  in. apart, and Link Belt grit removal and washing equipment. A Gruendler screenings grinder, equipped with a  $7\frac{1}{2}$  hp motor, disposes of the screenings.

The primary clarifiers are two in number, rectangular, each 36 ft. by 175 ft. Equipment for sludge removal is Link Belt. Process Equipment aeration jets add to the efficiency of sedimentation. A retention of approximately 2 hours is

provided for the normal design flow.

The effluent from the primary tanks is chlorinated and discharged into the Puyallup River. There are two Wallace & Tiernan chlorinators with 3,000 capacity.

Sludge treatment involves digestion, elutriation and filtration, with provision for converting the dewatered sludge into a marketable fertilizer. The sludge is handled from the sedimentation tanks by a battery of nine 75-gpm Marlow sludge pumps, driven by General Electric Motors. There is one primary digester, 75 ft. in diameter, with a PFT floating cover, and a secondary digester of the same size. Total digestion capacity is 194,000 cubic feet. Heating equipment is PFT, with a capacity of one million btu. The sludge recirculation pump is Fairbanks-Morse, 150 gpm.

The digested sludge is elutriated in tanks equipped with Link Belt collectors. There are two Oliver sludge filters, each 64 inches in diameter and 48 ins. long. The dewatered cake is discharged onto a Link Belt conveyor for final processing and/or disposal.

Pumping of the sewage is handled by four Morris sewage pumps. These have capacities of 4,000, 8,000, 10,000 and 12,000 gpm, respectively and are equipped with Westinghouse motors.

### Construction Data

Owing to the nature of the soil composing the soft and marshy tidelands area where the plant was constructed, special construction procedures were necessary. As a support for the plant, 1,460 wooden piles 30 ft. long were driven to rock, and the plant foundations were constructed on top of these piles. The considerable excavating required in this phase of the work was done with two Northwest and two Link Belt Speeder shovels. Two TD-9 International tractors were used for the surface earth-moving jobs. All concrete used in construction was brought in to the site ready mixed.

An area around the plant is being landscaped and converted into a park. Appropriate shrubs and flowers will be planted and maintained. The plant buildings, which include an office building, a pumping and chlorinating building and a sludge filtration building, will be heated by surplus digester gas.

J. S. Roberts is Commissioner of Public Works for Tacoma. Supervising the construction of the plant for the city was L. E. Fox, with Ketchum Lyman serving as operating engineer for the plant, which will employ a chemist and three other operators. N. H. Daniels was chief engineer in charge of construction for the contractors.

### Street Costs

(Continued from page 53)

ment surfaces at a later date. Under our present system, we extend each utility to the back of the curb at the time of initial construction. In addition, curbs and gutters must be constructed prior to installation of permanent type street surfaces.

One of the foremost requirements for a successful program for using city forces on construction work is a proper wage adjustment program. It is imperative that the personnel take pride and a personal interest in their work and this can be done only through an adequate wage program. We feel we have such a program. Street department wages have been increased 40 per cent to 100 per cent during the past two years. As a result, we have been able to keep our experienced men on the job.

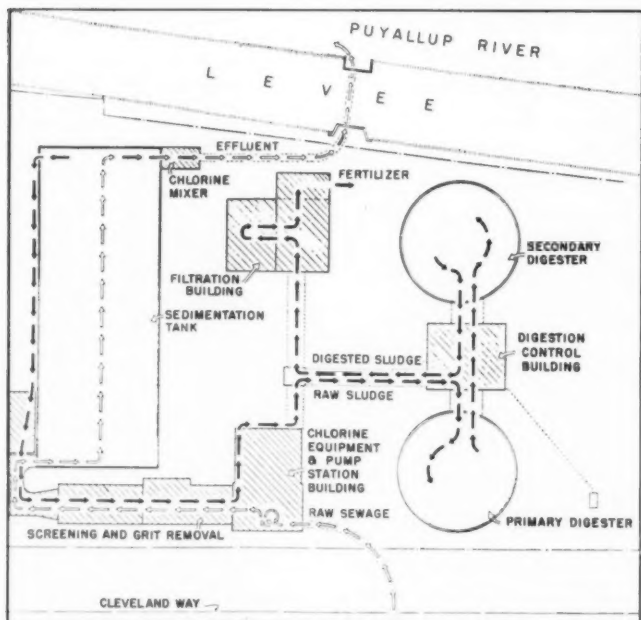
Other factors have contributed to the success of our program. Outstanding among these is the co-operation of my fellow commissioners. Without their understanding and assistance, our program could not have succeeded. Our planned program has been another essential factor contributing to our achievements. Our decision to purchase our own equipment and to undertake ourselves the construction and repair of our streets, with consequent savings has been important, as has been our policy to secure and retain qualified personnel.

This article is published, with slight modifications from the original, through the courtesy of The Newsletter of the Tennessee State Planning Commission. The photographs were furnished by Mr. Frizzell. Table 1 is from Town and City, Tennessee Municipal League.


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### Highway Construction Costs Continue to Rise

Highway construction costs rose to a new all-time high for the second quarter of 1952, according to a report on "Price Trends for Federal-Aid Highway Construction" by the Bureau of Public Roads. The new index stands at 171.8, (1925-1929 average equals 100) up 1.6 per cent over the first quarter of this year. In terms of 1940 dollars today's highway construction dollar is worth 41.7 cents, and indications are that this value will continue to decrease, according to the BRP.



● FLOW DIAGRAM: Capacity is 27 MGD, and up to 42 MGD storm flow.

<p><b>VICE PRESIDENTS</b>  <b>MILTON OFFNER</b>  <b>EDWARD P. DECHER</b>  <b>RALPH C. GRAHAM</b>  <b>WARREN A. COOLIDGE</b></p> <p><b>PAST PRESIDENT</b>  <b>EDWARD J. CLEARY</b></p>	<h1 style="margin: 0;">A P W A</h1> <h2 style="margin: 0;">news</h2> <p style="margin: 0;">AMERICAN PUBLIC WORKS ASSOCIATION          1313 EAST 60TH ST., CHICAGO 37, ILL.</p>	<p><b>DIRECTORS</b>  <b>J. J. DEAN</b>  <b>SOL ELLENSON</b>  <b>GEORGE G. HYLAND</b>  <b>JEAN L. VINCENZ</b></p> <p><b>TREASURER</b>  <b>ALBERT G. WYLER</b></p>
<p><b>ALLAN H. ROGERS, President</b></p>		<p><b>DONALD F. HERRICK, Executive Director</b></p>

## Getting Acquainted with the APWA

WITH the purpose of acquainting the readers of Public Works with the American Public Works Association, we present a short resume of the history of the Association, its aims and purposes, and its activities.

### The Parent Organization

The foundation for the organization destined to become the American Public Works Association was laid in 1894. During the summer of that year, M. J. Murphy, Street Commissioner of St. Louis, suggested the formation of a society to meet annually for the purpose of discussing improved methods of municipal engineering operation. As a result, a meeting was held in Buffalo in September, 1894. Some sixty persons, representing sixteen cities, met and organized the American Society for Municipal Improvements.

This society enjoyed a steady growth in membership during the following 34 years. With the expansion of its activities into broader technical fields, its name was changed at the Richmond, Va., meeting in 1930 to the American Society of Municipal Engineers.

Meanwhile, another organization, which was to become an integral part of the APWA, was developing. To further the considerable interest in street cleaning and sanitation, a Conference of Street Cleaning Officials was proposed. On the invitation of the Elgin Sales Corporation and the City of Chicago, the conference met in that city in October, 1919, with some thirty street sanitation officials, representing twenty cities, present. As a result of the interest developed, a second meeting was held in Chicago the following year and the International Association of Street Cleaning Officials was

officially formed. In 1921, the name was changed to the International Association of Street Sanitation Officials. By 1929, the membership reached 250. At the 1930 conference, the name of the organization was changed to the International Association of Public Works Officials, since the interests and the activities of the association had by this time expanded to cover a larger portion of the public works field than was originally contemplated.

Due to the fact that the International Association of Public Works Officials and the American Society of Municipal Engineers had a great number of common interests in the public works field, a joint meeting of the two associations was held in Rochester, New York, in September, 1934. At that meeting action was taken by both groups to establish headquarters at 850 East 58th Street in Chicago and to conduct their activities through the appointment of Donald C. Stone as Executive Director of each.

The year 1935 brought about very close relationships between the two groups and again a joint meeting was held in Cincinnati in October of that year. This joint meeting was called the Public Works Congress which name we still use to this day. At this time the joint membership stood at the 600 mark.

### APWA Is Founded

The matter of joining the two organizations by the adoption of a new constitution had been considered for some time and at the joint meeting of the Boards of Governors of both groups in September, 1936, such a constitution was adopted to take effect on January 1, 1937. It was thus that the American Public Works Association came into being on that date with some 760 members on its rolls.

Organized as a non-profit corporation, the Association conducts its affairs under the guidance of a Board of Directors elected by the members. The Board has established as the fundamental purpose of the Association, the providing of the means whereby those engaged or



● CHICAGO headquarters of the APWA are located in this beautiful building.

interested in public works can:

(1) Share their ideas and experiences; (2) unite their efforts toward the steady improvement of operational, technological, and administrative practices; and (3) act together to achieve the status and the resultant recognition due those who efficiently perform essential work in the service of the people. To these purposes the American Public Works Association is dedicated. To achieve its purposes, the Association:—

Promotes the advancement of the status of public works service.

Publishes a monthly News Letter, the annual Congress proceedings and a Yearbook Directory. (The membership fee covers the subscription to these publications.)

Answers requests for information on specific problems.

Prepares manuals of practice in selected fields of public works operation.

Prepares standard specifications for many types of public improvements.

Issues and distributes to its members special reports on public works problems and practices.

Carries on research in the field of public works administration.

Provides a personnel exchange for members and fosters the recruitment of public works officials on a nation-wide basis.

Sponsors the annual Public Works Congress.

Holds local, state, and regional meetings.

Assists local and state chapters in their programs of activities.

The Association now maintains its headquarters at 1313 East 60th Street, Chicago, Illinois. The building houses fourteen other governmental associations including such groups as the Council of State Governments, the International City Managers Association, American Society of Planning Officials, the American Municipal Association. While each group is autonomous in its character and activities, several joint services are maintained such as the Joint Reference Library and the Personnel Exchange. The close cooperation of all agencies in this building makes it truly a clearing house of information in all phases of government, local, state and federal.

Fifteen years have brought many changes to the Association. Its membership is now over the 2,000 mark

(Continued on page 91)

## Washington



## news

Presented in cooperation with the American Public Works Association and through the courtesy of the Washington Office of the American Municipal Association.

### First Quarter, 1953, Structural Steel Allotments

Allotments of structural steel for the first quarter of 1953 which, in general, will allow continuation of all construction in the country already started but will permit only a limited number of new starts, have been announced. Ralph S. Trigg, DPA Deputy Administrator for Program and Requirements, said that, with a few exceptions, allotments of structural steel are limited to the advance allotments previously made for the first quarter of 1953, and reflect the loss of steel production caused by the steel strike.

The Bureau of Public Roads was given an increase of 7,500 tons over the previous quarter in order to provide for continuing current projects and a very few highly essential new ones such as the Ohio Turnpike.

### Water & Sewerage Industry Requests Higher Priority

The Water and Sewerage Industry Advisory Committee has recommended reclassification of water and sewerage industry projects to improve their claim on scarce materials in case of future emergencies.

The Director of the Water Resources Division has explained provisions of proposed relaxations of construction regulations to become effective April 1, 1953. Under the proposed Dir. 8 to CMP Reg. 6, projects of the industry would be permitted to self-authorize quarterly allotments of up to 25 tons of carbon and alloy steel, including structural, not to include more than 2½ tons of alloy and no stainless; 5,000 pounds of copper, and 4,000 pounds of aluminum for each project in any quarter.

At present the industry may self-authorize only five tons of carbon steel—not to include more than two tons of structural but no wide-flange beams or sections, 1,000 pounds of

copper and 2,000 pounds of aluminum for one project in a quarter.

NPA officials also said they propose to raise the dollar limit on DORating authority for purchase of non-controlled building equipment and production machinery.

### Vast Highway Program In Near Future

An estimated \$2,000,000,000 in state and Federal funds already have been earmarked for highway purposes. With \$2,000,000,000 a year being collected by the states in gasoline taxes a vast highway construction program could be accomplished without the necessity of any financing by most states.

For new construction and maintenance of existing highways, it is estimated that the states this year will spend \$1,900,000,000, compared with \$1,381,506,000 last year and \$502,196,000 on maintenance. Included in these figures, however, are \$400,000,000 contributed each year by the Government.

With State expenditures for new highways and maintenance approximating receipts from gasoline taxes, the equivalent of virtually all the Federal aid funds may be added to reserves. At the end of last year it was estimated that these reserves for new construction by the states approximated \$1,100,000,000. Government funds authorized but not appropriated for highway aid to the states are placed at \$1,000,000,000.

The Federal gasoline tax, which last November 1 was increased to two cents a gallon from one and one-half, is expected to yield a record high this year of \$804,223,000, according to a recent calculation by the American Petroleum Industries Committees. In 1951 this tax yielded \$607,756,000. State and Federal gasoline tax collections this year are estimated to approximate \$2,778,223,000. The state's collections are placed at \$1,984,000,000, against \$1,058,605,000 in 1946.



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## saves Money on Snow Removal

**L. M. McCONNELL,**  
Manager, Warren, Pa.

**L**AST winter, for the first time, we began spreading coarse rock salt on the main traffic arteries in Warren. I'd observed its use in other communities and knew that it would do a fast, money-saving job of keeping the streets snow and ice free. Actually, as we discovered, it did more than that. In previous years cinders had been used on the streets here and, of course, they left a messy, dirty residue behind that had to be cleaned up when the storm was over. Coarse rock salt eliminated that work and gave us clean streets as well as safe ones. The people like it, too. They appreciate the fact that it does save money and at the same time enables us to provide better, faster snow removal service for them. As a result, we are using it again this year and plan to continue to do so in the future.

As soon as our street improvement program is completed—generally around the first of November—we begin preparing for snow removal operations here. We have a number of snow storms every winter and one or two ice storms as well; generally these are much more dangerous to drivers than heavy snows. The first storm is apt to come in late November or December, and



● **ROCK SALT** and Banox are mixed as they are fed to the spreader.

we begin storing coarse rock salt early, so that we have a supply on hand when we need it. As fast as we use it during the winter we replenish the supply, storing it in bags in our warehouse. In that way—by keeping reserve stock on hand at all times during the snow season—we are able to keep our main streets safe in spite of the weather.

Although we kept no exact cost records last winter, we do know that the use of coarse rock salt saved considerable money because it speeded up our entire operation. A load of coarse rock salt covers about 5 times more street surface than a load of cinders; that means, of course, that we save a great deal of

time in the spreading operation alone, because we don't have to load the truck as often, and the driver doesn't have to waste time coming back to the warehouse for refills.

In addition to that, coarse rock salt removes ice and snow up to three or four inches in depth and makes it unnecessary to plow. And, for heavier snow falls, it considerably reduces the amount of snow that has to be plowed. For that reason, we have found, it also saves a good deal of time and money by reducing our plowing time.

We began by using coarse rock salt in the business district, and particularly at intersections. We have a Tarco Scotchman Spreader, and we found that by setting it at the minimum spread and starting at the beginning of a storm, we could remove the fall easily. Cinders used to build up a snow and ice mat on the streets, and during prolonged storms we had to spread them several times, because the snow would cover them quickly. With coarse rock salt we get bare street surface and, in general, we have found that one application is sufficient. Because we have been able to provide bare streets, we believe that we have also reduced the accident rate here throughout the winter.



● **RESIDENTIAL** sections are included in the snow melting program. Here salt is being spread to remove packed snow.



● **DOWNTOWN** street photographed shortly after salt-plus-Banox was used following a snow storm early in 1952.

## REPORTS from the FIELD Better Methods and Equipment

OUR MOST efficient operation was our Lull front end loader, bucket size  $1\frac{1}{4}$  cu. yds., on a MM tractor, feeding aggregate to a bituminous mixing plant. Next was our Parsons trenching machine No. 202, constructing sanitary sewer lines. Also our Link-Belt Speeder shovel,  $\frac{1}{2}$  cu. yd., with boom and drag bucket attachment on storm sewers. H. M. Hargett, City Engineer, Florence (30,000), Ala.

A BUCKEYE diesel shovel,  $\frac{3}{4}$ -yd., was used for opening three creeks for flood control. These creeks run through the city. Our TD-14 International tractor with bull'cam is efficient for sanitary fill. R. Powell Black, City Manager, Jasper (8589), Ala.

A FRONT END loader was used most effectively on street graveling jobs and a street resurfacing program. D. E. Shannon, Sup't. of Streets, Winslow (8000), Ariz.

OUR MOST effective application of equipment has been the use of a 20-ft. tree dozer boom, replacing the dozer blade. This has been very efficient. T. J. Fricke, City Engineer, Stuttgart, (7500), Ark.

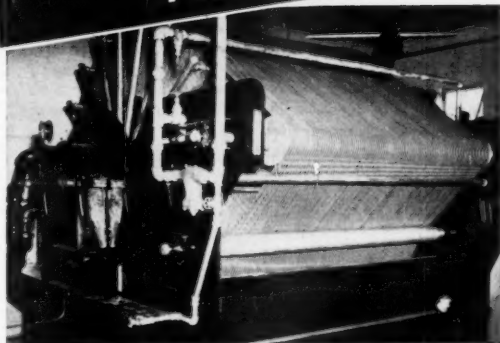
BACKHOE HAS been very effective for digging trenches for water lines and sewers, especially in the rocky soils which we have. F. O. Myers, Ass't. to the City Engineer, Azusa (12,000) Calif.

REFUSE PACKERS save money. We have put packers on our garbage pickup service and have found that they have saved considerable in man-hours, mileage and operational costs as compared to open-type trucks. Clayton W. Paige, City Engineer, Burbank (81,500) Calif.

FOR ROADMIXING lime stabilized seal-coated secondary streets, we have used a Seaman mixer very effectively. Robert Bailey, City Manager, Chico (12,500) Calif.

PROBABLY MOST outstanding use of equipment was due to a landslide last winter. A slide of swampy mud covered approximately 200 ft.

## Here's help on your SLUDGE DEWATERING PROBLEMS



Komline-Sanderson COIL SPRING Sludge Filter Installed at Liberty, N.Y.

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of roadway to a depth of 3 ft. Using a No. 55 Austin Western grader to clear, as one side of the road was available for deposit, we had the roadway open to full traffic in four hours, whereas it would have required four days by other methods. Jack Kendall, Street Sup't., Fairfax (4,700) Calif.

**MOST EFFECTIVE** use of equipment was the construction of some 80 blocks of road-mixed resurfacing work with a Seaman pulvmixer. R. E. Graham, City Engineer, Merced (16,000), Calif.

**QUICK-WAY** 3/4-yard backhoe used for trenching was our most effective equipment. We have clam-shell attachments and a 30-ft. boom, which are very handy on this truck-mounted unit. Chas. R. McCorkle, Sup't., Water & Street Dept., Needles (6,000), Calif.

**WE PROBABLY** used equipment most effectively on storm damage clean-up work. We used bulldozers, motor patrols, skip loaders and dump trucks on slides and heavy debris deposits on highways and

streets. We used truck-shovel-drag-line and dump trucks on drainage channels, hillside sloughs and heavily silted natural drainage channels. —John H. Allin, City Engineer & Sup't. of Streets, by D. C. MacKenzie, Ass't., Pasadena (106,000), Calif.

**WHILE MOST** of our new construction is by contract, we handle maintenance with city forces. We have found our Case tractor with a front-end loader very effective in mud and debris removal after severe storms. We also use it in place of a "cherry picker" for handling pipe and manhole frames and covers and also for setting pre-cast manhole sections. H. N. Krull, Ass't. City Engineer, San Rafael (14,000), Calif.

**GARBAGE** is hauled by the city in regular packer-type units. Trash and rubbish are hauled in 16-yd. low bed, open body dump trucks of our own design. These have effectively licked the trash and rubbish hauling problem. Bernard P. Westkamper, City Engineer and General Manager of Department of Public Utilities, Tulare (14,000), Calif.

**MOST EFFECTIVE** use of equipment was our Quick-Way shovel with backhoe attachment which we used to install water and sewer mains and fire hydrants. A D4 Caterpillar bulldozer was used for backfilling. For street shaping we use a Galion motor grader. Victor G. Seiferth, City Engineer, Golden (5,800), Colo.

**EQUIPMENT** that we have used very effectively include a Caterpillar motor grader for street maintenance and repair; a Hough loader for general work on the streets and for ditch filling; a Quick-Way shovel on an Army half-track, with backhoe and boom; and a Barber-Greene ditcher. Tom Russell, City Manager, and L. F. Garlington, City Engineer, La Junta (7,900), Colo.

**OUR MOST** money-saving equipment is a small tractor that we use for cleaning two 18 mg capacity concrete lined water storage reservoirs. For years, the silt and sand were hauled out of these reservoirs at a terrific cost—as high as \$5,000 per year. Then we purchased a small tractor and put a blade on

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**SEWER PIPE JOINTS**  
(a cement joint)

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it. Now it costs us about \$250 to \$350 per year for cleaning. We bulldoze the material to the outlet and wash it down a 15-inch sewer. We have saved thousands of dollars on a very small investment. Next in value is our Quick-Way shovel mounted on a truck. We do everything with it—load, dig and move materials. It cost \$8,000 and I am convinced we save our people \$8,000 a year by its operation. Harry Barnes, City Engineer, Rocky Ford (5,000), Colo.

FOR OUR size town, our Allis-Chalmers HD-5 tractor loader is indispensable. Among other things, we use it for loading sand, gravel and patch material; for scarifying roads; and for setting culvert pipe. Mario A. Orefice, First Selectman, East Lyme (4,500), Conn.

MOST EFFECTIVE use of mechanized equipment has been in the construction and landscaping of parkways. This involves bulldozing hard limerock, 4 to 6 inches, replacing with soil, sprigging grass, preparing tree holes in the same rock, and final landscaping. Location of soil pit averages 11 miles one way. Equipment used includes D6 Caterpillar bulldozer, Caterpillar No. 12 motor grader, Lorain 1-yd. motor crane, several 4-yd. dump trucks, Huber maintainer, Mandt swingloader and Gar Wood crane mounted on an International truck. W. T. McIlwain, City Manager, and L. W. Robinson, Jr., Sup't. of Public Works, Coral Gables (20,000), Fla.

OUR NEW Elgin pick-up sweeper with 6-ft. broom is about our most effective and useful equipment. We work this in the business district. We also have a 5-ton Hyster crane which we use for handling and stacking pipe and in our maintenance garage for lifting equipment. Eugene C. Hedges, City Engineer, Hollywood (20,000), Fla.

A BUCYRUS - ERIE  $\frac{3}{8}$ -yard dragline and a Caterpillar front-end loader are our most useful equipment. H. J. Mac Cotter, City Manager, Jacksonville Beach (7,000 to 20,000, according to season), Fla.

IT IS DIFFICULT to tell which equipment is most effective, but perhaps our Holmes-Loader dump truck combinations, of which we now have three, are most effective. These were used on street repair,

street cleaning and hauling all sorts of materials. Our 4-yd. dump trucks can load themselves in approximately 4 minutes. Max Sturm, City Engineer and Director of Public Works, Sarasota (20,000 to 40,000, according to season), Fla.

FOR CUTTING roots out of sewers, our Flexible Sewer Rod equipment was most efficient. For street work, the Barber-Greene paver was similarly valuable. Bernard F. Smith, Borough Engineer, Waynesboro (12,500), Pa.

FOR GRADING and paving streets with asphalt penetration macadam by force account, we found our Caterpillar motor grader, Oliver tractor with front-end loader and Galion 7-ton roller are most effective. Bernard L. Marsh, Borough Manager, West View (7551), Pa.

WE PURCHASED a new Packmaster garbage truck and started a regular garbage service for the first time. Leon A. Carver, City Manager, Burkburnett (6500), Tex.

## A modern barrel makes an old Mathews Hydrant good as new



# MATHEWS HYDRANTS

Made by R. D. Wood Company

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Manufacturers of "Sand-Spun" Pipe (centrifugally cast in sand molds) and R. D. Wood Gate Valves

• Many a Mathews Hydrant has been in service for several generations. When the time comes to modernize, it is a simple matter to remove the old barrel and replace it with a modern one. It is unscrewed from the elbow, then withdrawn through the protection case and a new barrel inserted in its place. The job is done in a few minutes without digging or breaking the pavement.

## Mathews Modernized Hydrants ... Tops in Convenience and Dependability

Compression-type valve prevents flooding • Head turns 360° • Replaceable head • Nozzle sections easily changed • Nozzle sections easily raised or lowered without excavating • Protection case of "Sand-Spun" cast iron for strength, toughness, elasticity • Operating thread only part to be lubricated • All working parts contained in removable barrel • Available with mechanical-joint pipe connections



**TWO BARBER-GREENE** snow loaders had their best test last January, with snow falling, melting and freezing every 24 hours for about 28 days. This gave us the worst ice conditions in years. We had to rip to 2 to 4 ins. of ice off our streets and load it after windrowing. The loaders chewed up and loaded chunks of ice 2 to 3 ft. square. We worked around the clock for 24 hours a day for 31 days. In 8 hours, 8 trucks handled 400 truckloads of ice. Our new Hough loader proved an excellent helper for loading ice and snow. We used it mostly in shopping areas because of its mobility. It has been a fine investment. Our five Adams patrols also performed a wonderful job, ripping and plowing 2 to 5 miles of ice and snow 24 hours a day for 31 days, without a stop. Lawrence W. Espey, Sup't. of Public Works, Spokane, Wash.

**FOR SEAL-COATING** 26-year old asphalt pavements, we used a Rosco distributor, a Case tractor broom and sand spreaders. First 0.2 gal. per sq. yd. of MC asphalt was applied; then this was covered with sand; and after penetration, the



Stump-splitter consists of sharpened bar mounted on bulldozer blade of International TD 24 crawler tractor.

sand was swept to the gutter and removed. This method has been very effective against pavement break-up in the spring. William A. Collins, City Engineer, Beloit (29,-541), Wisc.

**IN OUR SANDY** soil, we have found that we can contract excavation by dragline in the spring and stockpile enough to last a year at our sanitary fill garbage disposal area. Our D6 dozer can handle the spoil banks for covering garbage all winter. We use a 14-ft. depth,

60 ft. wide at the top, and are well pleased with our method. Neal Bartholomew, City Engineer, Eau Claire (36,600), Wisc.

**OUR BARBER-GREENE 522** bucket loader has performed exceptionally well on snow removal, loading materials, grading out for curb and gutter, loading street sweepings and loading top soil for terraces. Our Austin-Western 99H power grader also gives excellent year-around service, in the winter for snow and in the summer on our curb and gutter program. Between times it does yeoman service in scarifying and shaping roadways. Charles R. McKee, Director of Public Works, Fort Atkinson (6200), Wisc.

**GOT A NEW** hydraulic Trackson loader, the finest I've seen and a bear for work. Incidentally, I don't want to miss a single issue of Public Works. Would appreciate a little supplementary data on asphalt mixes and field testing. (Thanks a lot; we'll try to supply it. Editor). Robert J. Poss, Director of Public Works, Marinette (15,000), Wisc.

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writes

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## Pneumatic Conveyors for Bulk Chemicals

(Continued from page 51)

Almost any reasonably dry, bulk granular or powdered material can be conveyed pneumatically. This includes a wide variety of materials from fine powders to those having up to two-inch lumps. In water and sewage plants activated carbon, alum, ammonium sulfate, clays, ferric sulfate, ferrous sulfate, lime and soda ash are conveyed with equal facility.

### Requirements for Design

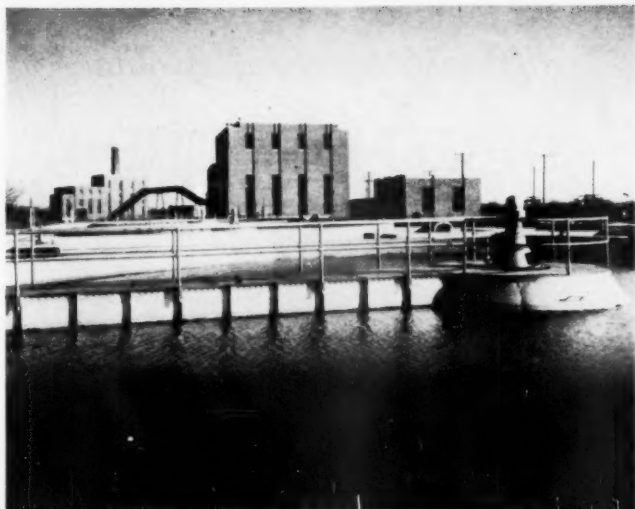
The design of a pneumatic conveyor must make allowances for the many operating variables, such as conveying distances, material characteristics, air-material ratio and handling rate. As these differ with each application, each system must be custom-engineered to integrate these factors into an efficient installation. This requires special engineering knowledge.

The high order of engineering "know-how" required to assure high efficiency has limited the number of producers of such equipment. Pneumatic conveyors are manufactured by the Fuller Company (Catasauqua, Pa.), the Dracco Corporation (Cleveland, Ohio) and a few others. Fuller produces the "AIRVEYOR", a conventional type pneumatic conveyor and the "AIRSLIDE" a gravity-type air-activated mechanism useful for special applications. Dracco manufactures "AIR-STREAM" conveyor systems of both the suction and pressure type.

### Specific Examples Illustrate Advantages

The exact manner in which the above advantages can produce automatic, efficient operation in water or sewage plants can best be illustrated with actual pneumatic conveyor installations.

**Flexibility and Compactness.**—The flexibility and compactness of a pneumatic system are illustrated by the recent Dracco "Airstream" installation at the City of Owensboro (Kentucky) Water Works. In this combination "suction-pressure" system, incoming chemicals are unloaded from railroad cars through a 250-ft. buried line. By means of a hose selector system, these chemicals can then be delivered to any one of four roof-top storage tanks. No visible dust is created by this filling operation.



### SPECIFY

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FOR HANDLING YOUR BULK  
ACTIVATED CARBON • ALUM  
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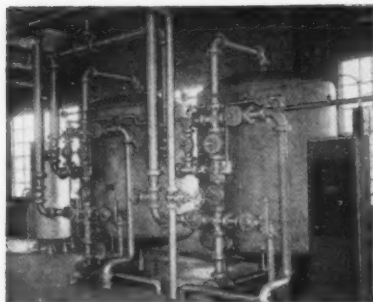
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Sectional drawings show the details of construction of the softeners, and full

data are presented on manual, semi-automatic and fully automatic control.

Send for Bulletin 78 now if you have a hard water problem.

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## TO PLAN A MODERN INCINERATOR... EVERY MUNICIPAL AND DESIGNING ENGINEER NEEDS THIS INFORMATION

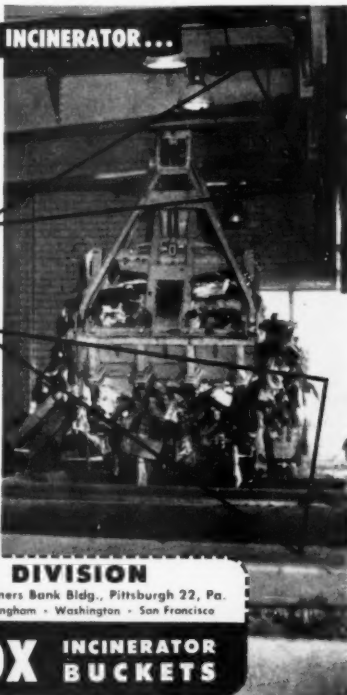
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This water works has achieved flexible, trouble-free materials handling with a pneumatic system having minimum space requirements.

**Versatility.**—The Dracco installation at the Minneapolis-St. Paul Sewage Disposal plant indicates how a pneumatic system can provide versatile handling. In this plant bulk chemicals are unloaded from box car transport with an intake nozzle (the only manual operation). They can be conveyed either to the Chemical Tower for discharge to main storage bins or to the Filtration Building for discharge to process storage. In both buildings the Dracco Receivers discharge the chemicals to inter-locked screw conveyors for distribution to the desired bins. Materials can also be transferred from any main storage bin to the Filtration Building where they are introduced into the sewage.

Thus with one pneumatic system the Minneapolis-St. Paul plant has obtained automatic handling meeting all operational requirements.

### The Adrian Installation

**Long Distance Conveying.**—An interesting example of another advantage of Dracco "Airstream" conveyors is found at the City of Adrian (Michigan) Water Works. At this plant a handling problem was caused by the location of the railroad siding almost a quarter of a mile from the storage facilities. The Dracco "Airstream" system solves this problem with an 1100-ft. conveying pipe which bridges a river, then travels underground to the processing building. Through it, chemicals are moved to storage at five tons per hour.

With this system the City of Adrian has eliminated costly manual and mechanical methods for handling its chemicals.

**Low Maintenance.**—At the City of Hamilton (Ohio) Water Works a 500-ft. underground Dracco "Airstream" conveying line is still functioning efficiently after being buried for over 17 years. During this period no cleaning of the underground line has been required and maintenance of the entire system has been very low.

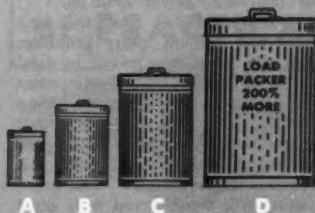
In all these installations clean, economical, highly advantageous materials handling has resulted from the use of pneumatic conveying. These and many other installations confirm the over-all excellence and suitability of pneumatic conveyors for transporting bulk chemicals.



# SQUEEZE

## REFUSE COLLECTION BUDGETS

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You can step up your refuse collection schedules and reduce your operating costs by putting Gar Wood **LOAD-PACKERS** to work in your community. Mail the coupon below, **NOW!**

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## City Treats Industrial Wastes

(Continued from page 56)

is provided in the chlorination building to discharge the plant effluent into the outlet stream at times of high flow level in the creek.

Three new 40-foot diameter sludge digesters are provided, each with a capacity of 25,700 cu. ft. It is planned that two of the new structures will be employed for stage digestion of the domestic sewage and dye waste sludge while the other new digester and the existing rectangular unit will be utilized for stage digestion of the wool scouring wastes. Operation experience, however, may indicate more satisfactory digestion results by combining the wool waste in some proportion with the domestic sewage and dye waste sludge. All digesters will be heated and the new structures are provided with floating

covers. With two of the new structures employed for the digestion of domestic and dye waste sludge, about 4.0 cubic feet per capita population equivalent will be provided. The one new digester planned for the wool scouring wastes will provide theoretically 7.7 days detention; however, with no scouring operations on Sundays, somewhat longer detention in the first stage unit will be provided. The existing digester contains 11,100 cubic feet for secondary stage digestion of the wool wastes. The sludge storage tank also has a volume of 11,100 cubic feet. All three new digesters have floating covers and the one reserved for secondary stage digestion contains a supernatant selector.

In addition to the former equipment consisting of two boilers to heat the old digester through coils, two new external heat exchangers are installed in the new digester control chamber. These units have a sludge heating rated capacity of

370,000 and 250,000 btus and a total boiler portion capacity of 553,000 and 375,000 btus per hour respectively. The burner equipment will utilize either gas or fuel oil.

With the two new additional drying beds, 30 feet by 104 feet, and adjacent to the existing three larger and two smaller beds, a total of 17,624 square feet of sludge drying bed area is available. On the basis of the design data employed in the planning, an average of 10.56 fillings per year will be required. It appears that this would indicate rather numerous fillings for practicability; however, area is available on the plant site for sludge lagooning should such practice prove necessary.

Suhr, Berryman, Peterson & Suhr, consulting engineers of Chicago, designed these sewage and waste treatment improvements as consultants for Rochelle, and are supervising their construction. Greeley and Hansen, also of Chicago, provided the consulting engineering service for the two industries. The treatment works additions and changes were constructed by the John Erskine Company of Skokie, Illinois, and the sewer work by Williams Construction Company of Joliet, Illinois. The original contracts were in the amount of \$232,180 for the plant work and \$24,743 for the waste sewer systems.

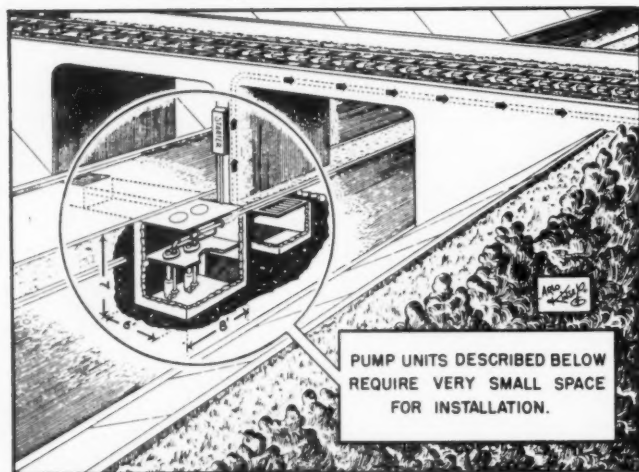
It is anticipated that the new plant will present many problems that will have to be solved by trial and error, and by the development of proper and effective operating technique. Certainly, these rather unique treatment works will be an interesting experience for Milo J. Prentice, superintendent. The functioning will be observed with great interest by persons who have been most concerned with the Rochelle industrial waste and stream pollution situation.

• • •

## Federal Aid Highway Act

The provisions of the new Federal Aid Highway Act have been summarized in Publication BGY of the American Municipal Association. This gives the breakdown and classification of funds, tells how municipalities may obtain Federal Aid, explains the uses of the different funds, covers defense and disaster funds, and includes a Bureau of Public Roads statements and explanation. Price is \$1. Write American Municipal Association, 522 Transportation Bldg., Washington 6, D. C.

## Submersible Pump Units for Underpass Drainage



**P**ROBLEMS of storm drainage for underpasses are simplified by the use of submersible pump units. These can be placed in a small sump in the middle of the roadway, since they require only a fraction of the space needed if motors have to be raised above any possible flood level. The artist's sketch above shows how such a unit is installed to remove storm drainage from a road dip.

Where Sepulveda Boulevard passes under the Los Angeles International Airport, two Byron Jackson submersible underpass units have been installed. Each of these units is designed to pump 1350 gpm against a head of 40 ft., operating at 1160 rpm. The impellers are two-port, of non-clogging design, since it is expected that the storm water may contain considerable debris.





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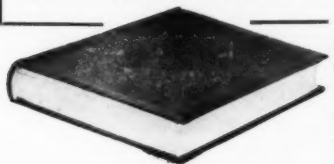
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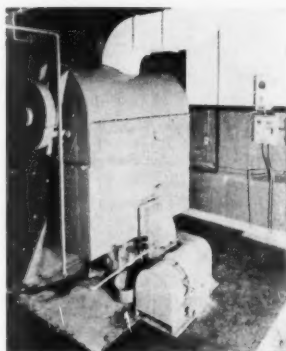
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## GRUENDLER EQUIPMENT MEANS BETTER LIVING THROUGH BETTER SANITATION

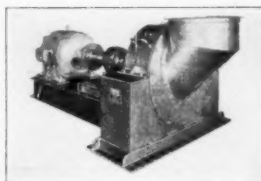
### SHREDDER

for sewage treatment plants, in combination with the usual bar screen, means uniform reduction for all matter, consequently easy disposal.



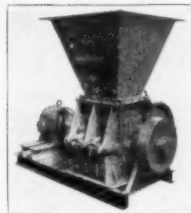
### AXILE GRINDER

for preparing waste, rubbish, leaves and small limbs, both before and after composting.



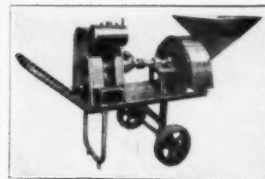
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for parks, estates, gardens, etc. Available in various sizes.



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**PUBLIC  
WORKS**

# DIGESTS

**T**HIS section digests and briefs the important articles appearing in the periodicals that reached this office prior to the 15th of the previous month. Appended are Bibliographies of all principal articles in these publications.

<b>SEWERAGE AND REFUSE . . .</b>	<b>80</b>
<b>HIGHWAYS AND AIRPORTS . . .</b>	<b>86</b>
<b>WATER WORKS . . .</b>	<b>92</b>

## THE SEWERAGE AND REFUSE DIGEST

### Farming on Refuse Dumps

Land used for refuse dump grows copious weeds, which makes the place an eyesore and require effort and money to prevent spreading to neighboring private lands. To eliminate these objectionable features, the sanitary inspector of Woking, England, last summer prepared a dump with a top area of 2½ acres and sowed it with rye in October. All but ¼-acre produced a good crop, which was sold standing. The average depth of the fill was 10 ft. It had been covered with 6 in. of excavated subsoil. This was disced for three days and then harrowed, producing a very fine tilth, on which the rye seed was sown at the rate of 3 bushels per acre; more than ordinarily dense, to check weed growth in the spring. This year they are preparing to sow 8 other acres to grass. Owners of low land suitable for dumping, in view of this success, are more willing to permit its use for this purpose by the municipality.

A. G. Davies—"The Utilization of Refuse Tips for Farming," *Municipal Engineering*, September 5.

### Treatment of White Water

The principal liquid waste from a paper board mill is the "white water." This is deficient in nitrogen, but ammonia nitrogen can be added as a suitable source of nitrogen for anaerobic digestion. At 30° C, with an applied BOD load of 0.044 lb. per cu. ft. of digester capacity per day, a BOD reduction of 71%, and total

of volatile solids reduction of 52% and 61%, respectively, can be expected. Approximately 3.2 cu. ft. of gas per pound of volatile matter added will be produced. For practical purposes, anaerobic digestion for 4 to 5 days is effective for the removal of approximately 70 to 80% of the applied BOD load, provided some nitrogen is added and the material is digested at about 30° to 35° C. When higher BOD reductions are desired, longer detention periods are required.

Willem Rudolfs and Herman R. Amberg—"White Water Treatment: Factors Affecting Anaerobic Digestion;" *Sewage and Industrial Wastes*, September.

### Filter Loadings And Recirculation Rates

In shallow high-rate filters, loadings in pounds of BOD per cu. yd. and the ratio of recirculation are the two factors which affect most appreciably the quality of the effluent; the rate of loading being the more important. Increasing the recirculation ratio may not produce an effluent sufficiently better to justify the added cost resulting from larger sedimentation tank requirements. The improvement resulting from an increase in the recirculation ratio will be a little greater with a two-stage filter than with a single-stage.

A two-stage filter, using exactly the same amount of medium as a single-stage and costing only a little more, will always give better results than a single-stage, and will generally be more economical than using a single-stage with a high recirculation ratio. If a two-stage

filter with a low recirculation ratio will not produce an effluent with the desired BOD, consideration probably should be given to the use of effluent filters. Given a required limit to the BOD of the effluent, the plant that will meet this at the least cost, including both construction and operating costs, is generally the one to be selected. The authors give formulas for calculating the sizes of filters necessary for producing a given effluent from a given sewage, using either single-stage or two-stage filters, with different loadings and recirculation ratios.

W. A. Hardenbergh and Edward B. Rodie—"Effects of Loadings and Recirculation Rates on Filter Effluents;" *PUBLIC WORKS*, October.

### Storm Water in Sanitary Sewers

The Central Contra Costa Sanitary Dist., in California, has an area of approximately 50 sq. mi., from which sewage is collected and treated in a central plant. Leakage of storm water into the system became so excessive during storms as to exceed greatly its capacity, and a survey was made to discover where it entered the several hundred miles of sewers. The main trunk sewer, 24 to 39 in. in diameter, was checked by men who crawled through it, equipped with gas masks, rubber suits, and two-way telephone communication. Here an insignificant amount of joint leakage was discovered, and a program was set up to check the sewers throughout the district, by inspection of roof leaders and yard drains, and of

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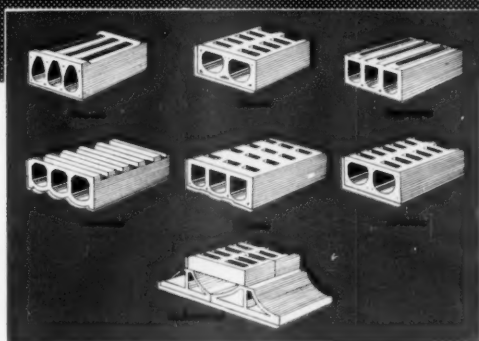
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sewers and sewer structures. The sewers were checked by taking at least three dry-weather readings and three wet-weather readings of sewage depth at each manhole. Several defective lines and manholes were found and repaired. Because most of the streets have little grade and are flooded during heavy rains, much water entered through the manhole to s. Tests showed that as much as 18 gpm would enter some structures, and most of them would take 3 to 6 gpm; and water stood for long periods of storm over several

hundred of them. In some cases, owners of flooded property would raise the manhole covers to remove the water. In a number of sections which crossed private property it was found that water entered through gopher holes. To detect cases of connections of roof leaders and yard drains to the sewer, 2 or 3 gal. of dyed water was poured into each leader that went underground. Manhole heads will be sealed with hot tar or bituminous cold mix. To prevent lifting of manhole covers, strips of steel will be

welded to cover and frame, so that use of a cutting torch will be necessary for raising the cover.

Victor W. Sauer—"Storm Water in Sanitary Sewers," *Sewage and Industrial Wastes*, September.

### Treatment of Los Angeles Sewage

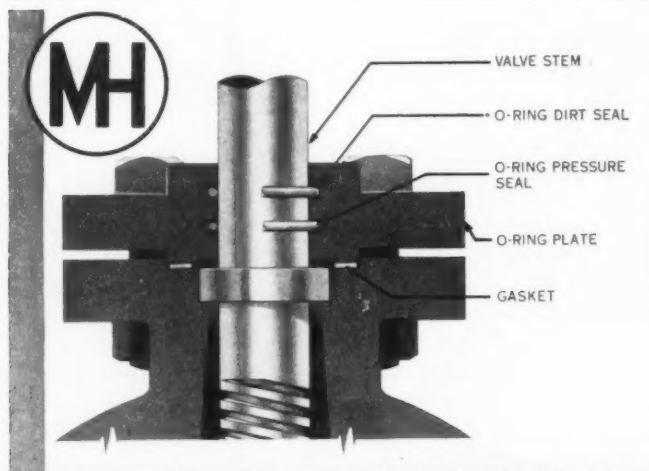
The Hyperion plant for treating the sewage of Los Angeles, Calif., went into full operation early in 1951. Designed for 245 mgd, it is now operating at 96% of design capacity, and plans are under way to provide treatment for anticipated increase. Metcalf & Eddy have recommended a 60 mgd activated sludge plant, using step aeration, at the mouth of the San Fernando valley, discharging its effluent into the Los Angeles river; to be enlarged to 90 mgd in 1965, and to 105 mgd in 1980. Also expanding the Hyperion plant to 315 mgd in 1965.

The Hyperion plant is producing a high-quality effluent, after eliminating several operating "bugs." These were due to a lack of trained personnel, early operation before entire completion, and lack of detailed knowledge of the sewage to be treated. The most spectacular "bug" was the frothing of the aerators, sometimes blanketing them 5 to 10 ft. deep; thought to be due to use of chemical detergents in homes and industry. It has been impossible to get the expected loading on the 16 vacuum filters, probably because of the extreme fineness of the sludge, which will not concentrate in the secondary digesters. This is thought to be due to the 55-mile travel of the sewage before reaching the plant. This has been partly improved by elutriation. Conditioning with lime must be limited, since the sludge is used as fertilizer and an acid fertilizer is required in southern California. Probably because of the staleness of the sewage and possibly because of high detergent concentration, the air demand is much greater than the 0.51 cu. ft. per gallon contemplated in the design. This problem is now being studied.

L. L. Wise—"What's Next for Los Angeles Sewerage?," *Engineering News-Record*, Aug. 21.

### Reducing Cost Of Tank Construction

In constructing an Imhoff tank and trickling filter at De Kalb, Texas, two construction devices



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were used that reduced the cost. In constructing Imhoff tanks, the forms and other details ordinarily employed for casting the thin, sloping bottoms of the flow-through channel are expensive and difficult. In this case the bottoms were precast slabs. Ledges 3 in. wide were constructed in the end walls on which to support these slabs, which were hoisted into place. This eliminated the necessity for form work.

The wall of the circular trickling filter also was built without forms. Instead, 6" x 12" x 12" glazed vitrified tile blocks were used. Each block had a slot in the top, reinforcing rods were placed and cemented in each of the continuous circular slots around the entire wall so formed at top of each course of blocks.

Walter F. Hicks, Jr.—"Two Design Features Reduce Sewage Treatment Plant Cost;" *PUBLIC WORKS*, October.

#### Detergents and Sewage Treatment

In 1951 about 1500 million pounds of detergents was produced in the U. S., of which about 90% were anionic agents, and more than 40% of these were of the alkyl aryl sulfonate type. The effect of detergents upon sewage treatment depends upon the concentration and type present in the sewage. The more widely used detergents (anionic and nonionic types) in concentrations expected to be found in sewage do not appreciably interfere with the oxidation of sewage alone or by activated sludge, but the cationic type (used for specialized purposes) retards these oxidations. Displacement of soap by detergents diminishes gas yields from anaerobic sewage sludge digestion without inhibition or retardation of the digestion process. Anionic and nonionic detergents interfere with chemical coagulation of sewage in terms of purification attained and modification of floc formed, but increase in the dose of coagulant can alleviate some of these adverse effects. Cationic agents lower the quantities of coagulant required and markedly decrease the number of coliform organisms during sewage sedimentation and produce an added effect to the bactericidal activity of chlorine. The three types of detergents in concentrations of 100 ppm show an improvement in the dewatering of fresh solids. Aeration efficiency in activated sludge units

may be impaired by surface-active compounds.

Raymond Manganelli — "Detergents and Sewage Treatment;" *Sewage and Industrial Wastes*, September.

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Two Design Features Reduce Sewage Treatment Plant Cost. By Walter F. Hicks, Jr., Cons. Engr. October, Pp. 67-68.

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**Harbor Refuse Disposal in a Large Port (Los Angeles).** By M. E. Sylvester. October, Pp. 80-81, 118.  
**Treatment Processes Completely Eliminate Cyanide Contents of Waste.** By Charles R. Loe III. October, Pp. 84-85, 120.  
**Effects of Loadings and Recirculation Rates on Filter Effluents.** By W. A. Hardenbergh and Edward B. Rodie, Editorial staff. October, Pp. 86-87, 98.

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**Detergents and Sewage Treatment.** By Raymond Manganello, Rutgers Univ. September, Pp. 1057-1068.  
**Measurement of Surface Tension of Sewage.** By D. R. Bowers, Chf. Chemist, San Dist. of Indianapolis. September, Pp. 1069-1076.  
**Aerobic Biological Stabilization of Organic Substrates.** By David B. Smith, Assoc. Prof. of C. E., Univ. of Florida. September, Pp. 1077-1090.

**Measurement of Carbon Dioxide Evolution from Aerated Sludge.** By Nandor Porjes, Lenore Jasiewicz and Sam R. Hoover, U. S. Dept. of Agriculture. September, Pp. 1019-1097.  
**Colorimetric Determination of Free Ammonia with a Pyridine-Pyrazolone Reagent.** By J. Kruse and M. G. Mellon, Purdue Univ. September, Pp. 1098-1100.  
**Metal Recovery by Ion Exchange.** By T. J. Faden, General Motors Corp. September, Pp. 1101-1109.  
**White Water Treatment: Factors Affecting Anaerobic Digestion.** By Willem Rudolfs and Herman R. Amburg, Rutgers Univ. September, Pp. 1108-1120.  
**Waste Disposal at the Fontana Steel Plant.** By H. J. Kieck, Stiel, Kaiser Steel Corp. September, Pp. 1121-1129.  
**Chlorine Demand of Waste from a Chemical Plant.** By Donald Tarvin, Amer. Cyanamid Co. September, Pp. 1130-1137.  
**Status Report on Synthetic Rubber Wastes.** By Royal E. Rostenbach, Synthetic Rubber Div., Reconstruction Finance Corp. September, Pp. 1138-1143.

**Biochemical Oxidation of Dairy Wastes.** By Sam R. Hoover, Lenore Jasiewicz and Nandor Porjes, U. S. Dept. of Agriculture. September, Pp. 1144-1149.  
**Some Aspects of Pollution Control in Tidal Waters.** By Kerry E. Mulla, Pan. Am. Refining Corp. September, Pp. 1150-1158.  
**Relationship of Aquatic Fungi to Water Pollution.** By James V. Harvey, Mycologist, U. S. P. H. S. September, Pp. 1159-1164.  
**Storm Water in Sanitary Sewers.** By Victor W. Sauer, Central Costa San. Dist. September, Pp. 1166-1170.

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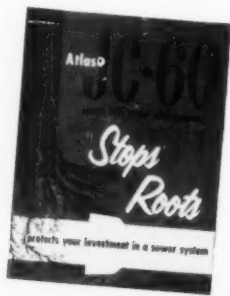
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**Control of Sludge Quality: Secondary Treatment.** By LeRoy W. Van Kleeck, Prin. San. Engr., Connecticut Dept. of Health. October, Pp. 517-521.  
**Better Plant Operation With Laboratory Control: Sewage Sludge.** By F. Wellington Gilreath, N. Y. State Dept. of Health. October, Pp. 522-528.  
**New York's \$317 Million Treatment Program.** By Richard H. Gould, Dir., Div. of Sewage Disposal. October, Pp. 528-536.  
**Owls Head High-Rate Activated Sludge Project.** By S. W. Steffensen, Project Engr., Bureau of Sew. Disp. Design. October, Pp. 537-542.  
**Hunts Point Plant Provides Conventional Step Aeration.** By Joseph Cunetta, Project Engr. October, Pp. 543-550.  
**Port Richmond Plant to Provide Intermediate Treatment.** By S. W. Steffensen, Project Engr. October, Pp. 550-552.



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#### Filling on Soft Mud Without Dredging

THE California Division of Highways is experimenting with a type of fill in the San Francisco Bay area, which, if successful, will go a long way toward solving the increasing congestion in the booming bay cities, according to H. L. Moses, Resident Engineer of the California Division of Highways, District No. 4.

Ordinarily, the soft mud which underlies the waters of the bay, must be dredged before solid fills can be placed to carry highways or other transportation systems. Dredging is a slow and expensive process, however, and engineers in the Division of Highways are attempting to place a fill of shale and clay without removing the soft mud by dredging.

#### Water 10 ft.; Mud 50 ft.

The experimental fill is being placed southward from Visitation Point near Bayshore, San Mateo County, in the general direction of Sierra Point, some two miles distant. At present, the fill is being extended about 2,000 feet into the bay in water averaging ten feet in depth at mean tide. The soft mud bottom here is approximately 50 feet deep and overlies hard compressed mud which will support ten tons per square foot.

Instead of dredging this soft mud before placing the fill, the fill material is being dumped onto the



mud and allowed to settle. The new fill pushes the soft mud out from under it, "like squeezing toothpaste from a tube", as Mr. Moses, puts it. Eventually, the soft mud rises alongside the new fill and allows the fill to settle to the firm base provided by the hard mud underneath.

Ordinary earthmoving equipment is doing the work with the Keeble Construction Company of San Jose, California, handling the \$175,000 contract under supervision of the California Division of Highways, District No. 4.

Two-thirds of the fill material is being removed by self-propelled scrapers and tractor-scraper combinations from the side of a large hill at Visitation Point. The remainder of the material is hauled by truck from various locations in San Francisco. Average daily material moved amounts to approximately 9,000 cubic yards.

If the experiment proves to be completely successful, the fill will be extended all the way to Sierra Point. It will carry a freeway which will connect with San Francisco's Bayshore Boulevard and by-pass Brisbane and several business districts.

Division of Highway engineers are optimistic about the results of this experiment but agree that it will take some months before final results can be determined. Should this method of fill prove successful, Moses believes there are several areas in the bay district where similar conditions exist and where this low-cost method of placing fills will allow proposed construction project to be completed at considerable savings in cost.

### Effect of Soil on Asbestos-Cement-Pipe

The National Bureau of Standards has reported the results of tests made on two makes of asbestos-cement pipe after exposure to 15 different soils for a maximum period of 11 years. It was found that the hydrostatic bursting pressure and crushing strength did not reach their maximum until after several years under ground, and were in every case higher than the requirements of the federal specifications. The pipe showed no appreciable deterioration in any of the soils, except that in some soils there was softening to a depth of less than 0.15 in.

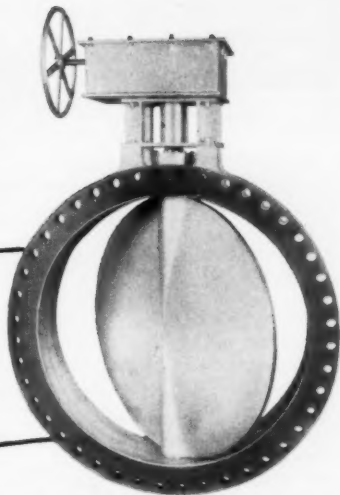
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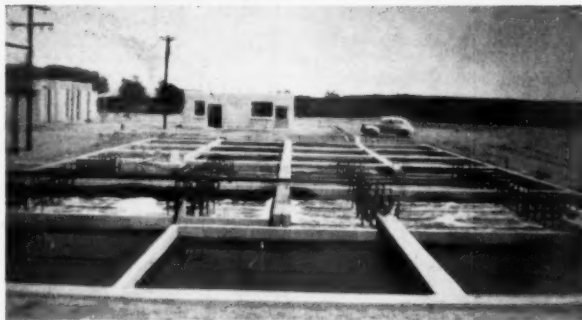
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**Laying Hot Asphalt  
In Rainy Weather**

In constructing a new Oregon Trail in Oregon, one contractor successfully laid hot asphalt plant mix during rainy weather, which was most of the time. The base was carefully prepared with a 1½ in. crown, using ¾ in. minus stone mixed with plenty of binder, and carefully surfaced so that there were no depressions in which water could stand. Mixed asphaltic material was delivered to a Barber-Greene finisher at about 275° temperature, which laid it, tamping it with a tamping foot. A 10-ton roller was run over it immediately and again after some cooling—often within an hour, with the air temperature as low as 40° and frequent showers.

Guy Browning Arthur — "A Super-Highway Amendment to the Oregon Trail," *PUBLIC WORKS*, October.

**Soil Acidity and  
Soil-Cement Roads**

In constructing soil-cement roads in Worcestershire, England, specifications are varied to allow for the varied acidity of the soils. In one ¾-mile stretch of stabilization work, 5 different specifications were followed. Years of experimenting with different additives have shown that some soils require appreciably more than others. Before selecting the method of improving the soil base on any project, laboratory tests are made on mixtures of the soil and different additives, usually cement or a combination of cement and hydraulic lime or other additives, to determine the percentages required and enable the engineers to specify the compaction of the soil base.

H. E. Brooke-Bradley—"Soil-Cement Roads in Worcestershire," *The Surveyor*, Sept. 6.

**Colored  
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Advantages of constructing road surfaces having colors other than the dark asphalt or light cement concrete are given as: Better visibility of objects on an asphalt road,

and less glare at night on concrete; contrast with pedestrian crossings, curbs, road signs, etc.; and for aesthetic value. Also for demarcation of traffic lanes for different types of traffic or different speed limits. Coloring may be obtained by use of colored stone as main aggre-

**Army Rock Crusher, Gift of Iowans**


**A** VETERAN of 23 months of straight combat duty in Korea leaves the battle zone for a well-earned rest, but after patching up in Japan, he is expected to return to Korea to help with a big job this winter.

This Korean old-timer is a \$12,000 rock crusher, a gift to the Army from employees of the Iowa Manufacturing Company, Cedar Rapids, Iowa, who built it. A plaque mounted on it honors the memory of Louis M. Parks, a fellow employee missing in action in World War II.

The 12-ton crusher was brought to Korea in October 1950 by the 633d Engineer Light Equipment Co. It crushes 25 cubic yards of rock an hour. Last winter, this primary unit with a gasoline engine was used 24 hours a day for three months. It crushed enough rock to lay a foundation for 20 miles of a main supply route to front-line troops before it finally became a war casualty itself. A rebuilding job is expected to prepare it for still more service.

## How to overcome industrial waste problems economically and effectively

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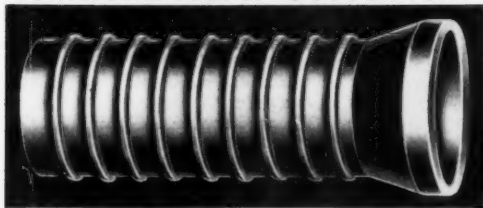
The methods, treatment plants, and units of equipment available for waste treatment are described, with numerous flow diagrams and photos showing their successful use. To minimize stream pollution and reduce costs of treatment, the book points up considerations of plant design and construction and techniques of reclaiming byproducts from industrial wastes. A wealth of background information—working methods and data you can use to profit, are embraced in this single volume.

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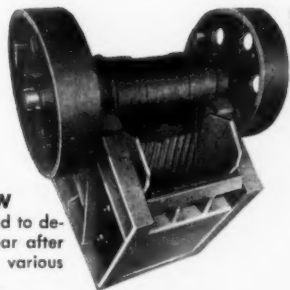
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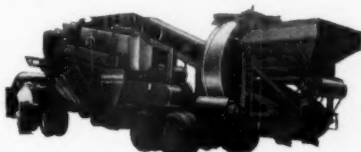
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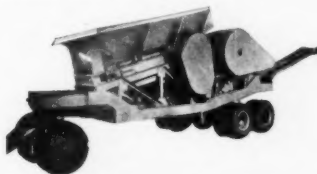
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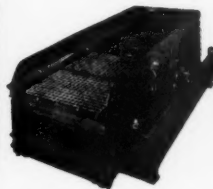
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gate or as surface dressings; by mixing with the cement or asphalt used a metallic oxide pigment—reds and browns are the most practicable. In case of asphalt, use that which is naturally as light in color as possible. Or a colored mixture can be used as a surface cover 1 in. or less thick, best applied by a mechanical spreader-finisher.

C. Greville Smith—"The Value of Colored Road Surfaces," *Highways and Bridges*, Sept. 17.

**Advertising  
Signs Along Highways**

Asked whether and how, by legislation or otherwise, their rights-of-way are kept free of advertising signs, thirteen state and county highway officials contributed to a "Forum" on the subject. Nearly every state has some kind of legislation that prohibits the erection of signs on highway rights-of-way. But it is difficult to enforce such laws. Some departments take down signs whenever they appear; others notify the owners and give them a time limit in which to comply with the law. Most report that the best way to discourage advertising on the right-of-way is to remove signs as quickly as possible.

"Advertising Signs on Rights-of-Way," *Better Roads*, September.

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Washington Is Planning for Traffic of Tomorrow. By William A. Bugge, Dir., Dept. of H'ways. September, Pp. 23-24, 42.  
Study Groups Take a Look at State Highway Organization. September, Pp. 25-26, 34.  
Practices of 13 states and counties. September, Pp. 27-29, 44.  
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**Engineering News-Record**

More Unreinforced Concrete Pavement Being Laid on New Jersey Highways. September 25, Pp. 38-40, 43.

**Highways and Bridges (England)**

The Value of Colored Road Surfaces. By C. Greville Smith. Sept. 17, Pp. 1, 3.

**Public Works**

Portable Patch Plant Solves Our Street Patching Problems. By Arnold Kobrecht, Supt. of Street, Antigo, Wis. October, Pp. 72, 73, 126.  
A Super-Highway Amendment to the Oregon Trail. By Guy Browning Arthur. October, Pp. 82-83, 108.

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Highway Bond Financing. By Hugo C. Dugan, William R. McCallum and Thomas R. Todd, Transportation Economists. October, Pp. 57-58.

**Roads and Streets**

Cement Stabilization Turns Scoria into Asset in Wyoming. September, Pp. 43-48.  
Snow Removal Problems and Practices in Massachusetts. By G. G. Love, Maint. Engr., Mass. Dept. of Pub. Wks. September, Pp. 64-72, 112.  
Quick Thickness Check for Sand-Bituminous Base Course Construction. By A. H. Freer, Florida Road Dept. September, Pp. 88, 90.  
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**The Surveyor (England)**

Soil-Cement Roads in Worcestershire. By H. E. Brooke-Bradley, Deputy Co. Surveyor. Sept. 6, Pp. 571-573.

**Wegen (Holland)**

Compacting of Bituminous Surfaces by Rollers. By F. H. J. Jansen. September, Pp. 211-214.

• • •

**Sewage Treatment and Water  
Pollution Research in England**

The annual report of the Water Pollution Research Laboratory of the Department of Scientific and Industrial Research for 1951 has just been published. Portions of this report are summarized below. The full report can be obtained from the Department, Charles House, 5-11 Regent St., London SW 1, for 65 cents plus postage.

**Treatment of Sewage**

Two series of experiments were made, one at Coventry and one at Birmingham, on treatment of sewage by alternating double filtration. In the first of these, at Coventry, the effect of omitting a stage of sedimentation, between the primary and secondary filters, was examined. The results agreed with those previously obtained with larger plant at Birmingham. There was some deterioration both in the quality of the final effluent and in the condition of the filters but the effect was comparatively small. In the second experiment some of the filters used are fitted with electrically driven rotary distributors so that the speed of rotation can be altered. The efficiency of the process has so far increased as the speed of rotation has been reduced. The lowest speed so far tried is 1 revolution in 30 minutes.

It has been shown that vigorous growth of some of the fungi found in percolating filters depends on the supply of a number of trace metals such as copper, cobalt, and zinc, and of the Vitamin B complex. The rate of growth is also greatly de-

pendent on the supply of oxygen to the fungus.

Experiments were continued at Stivichall in collaboration with the Gas Research Board. It was shown that addition of spent gas liquor of the ordinary type to sewage caused an appreciable deterioration in the quality of the effluent produced by biological filtration. No adverse effect was caused, however, by adding a similar concentration of spent liquor from the gas works at Hinckley. Here the liquor does not include retort-house liquor and the hot gas is treated in electrostatic precipitators with the object of reducing the concentration of "higher tar acids" in the liquor.

### Effect of Radio Isotopes

Work was carried out at the laboratory by a member of the staff of the Royal Cancer Hospital on the effect, on processes used for treatment of sewage, of five commonly used radio-isotopes—those of sodium, phosphorous, cobalt, bromine, and iodine. None of these substances was adsorbed to any great extent on sewage sludge. In secondary treatment by biological filtration or by the activated-sludge process, there was little adsorption of sodium bromine, or iodine, but phosphorous and cobalt were strongly adsorbed. Work on radio-isotopes is being continued and extended by the Water Pollution Research Organization and a special laboratory has been built for this purpose.

Some experiments were made on acceleration of de-watering of sewage sludge by electro-osmosis, a method used in some circumstances for de-watering soils. Although the application of an electric current increased the rate of drainage it is thought that the method would be too expensive for use on a large scale.

### Industrial and Toxic Wastes

Particulars are given of the composition of waste waters from the manufacture of penicillin and methods for treating these liquors described. It was concluded that, at a town in the North of England, the waste waters from a penicillin factory could best be treated with the sewage of the town. The capacity of the sewage works at this place has now been increased and alterations have been made to permit recirculation of effluent. Large-scale experiments on treatment of the liquor are to be begun this year.

Some work was done on the treatment of liquors from the manufacture of paper and particularly on the effect of chlorine in such liquors on biological filtration. The effect of chlorine was much less than had been expected.

An account is given of further work on conditions affecting the toxicity of potassium cyanide to trout. This work, which is being carried out under carefully controlled conditions, is being undertaken in the development of a standard test for toxicity of sewage and industrial effluents.

### Survey of Thames Estuary

During 1951, the London County Council made a large experiment in which part of the sewage effluent discharged to the Thames Estuary was chlorinated. However, no significant effect was observed on the condition of the estuary water, which from July to October was completely de-oxygenated over a distance of several miles. Sulphide was usually present in the water in this part of the estuary. Further examination of the very complete records of the condition

of the estuary obtained by the London County Council has shown that the degree of oxygenation in the estuary at any time is dependent to a large extent on the flow of fresh water over Teddington Weir.

### Phoenix Public Works

(Continued from page 49)

ling blocks to future annexations. In the past, newly annexed areas had to pay for such improvements by special assessments against the property.

Through improvements in the water distribution system and the installation of additional hydrants, reduced rates on fire insurance have been obtained throughout the built-up portions of the city.

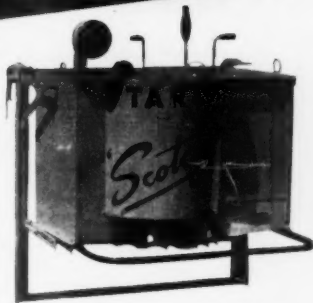
In order to lower the number of complaints that are brought before the Council in connection with Improvement Act work, and to eliminate the need for Council consideration of many details, the Public Works Director holds hearings before construction work begins. At these hearings, the details of the work are explained and views of the property owners, presented either

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orally or in writing, are considered.

**Building Maintenance.**—A recent change in the original organization of the Public Works Department has promoted the former Building Maintenance Section to the status of a division, with a superintendent in charge. Employees of this division now number 42. The change in status was necessitated by the increased work load and responsibilities. In addition to the maintenance and custodial care of the city's public buildings, telephone and multi-graphing services are provided.

### Revenue and Reaction

Water, Transportation and Airport are the three big revenue producers of the Public Works Department. In the fiscal year 1951-52, the Department collected approximately \$4,000,000 and spent about \$4,825,000, as compared to the budget for the present fiscal year of \$5,399,399. The volume of work done and the number of activities for which it is responsible are an indication of the challenge it faces. Phoenix is still a frontier city, in that its remarkable growth has been largely the result of immigration. It has grown from 11,000 in 1910 to 115,000 in 1952. Slightly more people live in the unincorporated fringe areas than in the 17.9 square miles which constitute the incorporated area. Both the area and the population will probably be substantially increased by an annexation program in the near future.

In the past two years, the taxpayers have shown their approval and appreciation of the Public Works Department in many ways. Many have said: "We should have had this Public Works Department a long time ago." There is no doubt but that the economies it has accomplished have justified its formation many times over. In addition, it has made accomplishments that were not possible under the old organization.

• • •

### Six Pumps

(Continued from page 63)

light side, the amount of unbalance was obtained, and that area specifically marked so that the required weight of material could be removed to offset the unbalance. A final balance was made after all work was finished, with the result that a one-pound weight would start rotation of the 37,000 pound impeller.

### The Pump Shaft

It is 51 feet from the bottom of the pump shaft to the top end of the motor shaft. Three lengths of 20½-inch diameter carbon steel shafting were supplied to span this distance. The pump shaft was 11 feet, the intermediate shaft 21 feet, and the motor shaft about 19 feet long. All shafts were made with integrally forged-on flange type rigid couplings. Each shaft coupling is fastened to the adjoining shaft coupling with fourteen 3 in. by 12½-inch body bound high tensile alloy steel bolts to carry safely the combined torsional and tensile loads. The shafts were turned and polished in a special 48-in. American horizontal lathe in the conventional manner. Specially designed steady rests were used to avoid undue deflection when shafts were machined. The drilling of the integrally forged couplings was done through a precision drill jig allowing 0.015 in. material interference for reaming at assembly.

To check the alignment and concentricity of the pump, the intermediate and the motor shafts were placed on specially constructed heavy duty horizontal rollers resting on cast iron bedplates set on the floor. Adjusting screws provided in the roller housings were used to locate the centering fits exactly in line. Temporary bolts were then inserted and tightened to bring the coupling flange faces together. Dial indicators were used to determine that concentricity was attained within a limit of 0.002 in. at the flanges and at the bearing fits. While the shafts were in this position a portable reaming fixture attached to the shaft enabled the reaming of the two adjacent flanges in perfect alignment. As each side was reamed a bolt was fitted with a maximum clearance of 0.0005 in. Constant rechecks were taken to determine if the nut pressure on the flange faces were affecting the shaft alignment in any way. All coupling holes and coupling body bound bolts were numbered after fitting in the shop in order to assure reassembly at destination without difficulty.

The connection between the pump shaft flange and the impeller coupling flange was accomplished in a similar manner except that the reaming was done in a vertical position. The concentricity check was also made in a vertical position by mounting the impeller and shaft assembly on a vertical 20-foot Niles boring mill table and indicating

the diameters at the impeller rings, bearing fits and coupling flanges. A total concentricity runout of 0.003 in. was attained.

The selection of suitable cars and the mounting of the large pieces on their required special and painstaking procedure. Due to their size, the center of gravity was high, requiring very rigid bracing and skidding to withstand the stresses or strains imposed upon them enroute. The small parts were boxed and suitably marked for each respective pump to facilitate erection at the site upon arrival.

### A P W A News

(Continued from page 68)

and its fields of interest have broadened to include every activity in which public works men are interested. Geographically, the membership is found in every state, Alaska, Hawaii, Canada, Brazil, Australia, Great Britain, Germany, Iceland, Israel, Netherlands, New Zealand, South Africa, and Sweden; and even in Ethiopia where Perry Fellows, formerly city engineer of Detroit, occupies the position of Director of Planning and Economics and Industrial Advisor to Emperor Haile Selassie.

### Chapters Developed

Among the major developments in the past several years have been the establishment of Association chapters created primarily for the purpose of providing opportunities for members to meet more often than is possible if but one national meeting per year is scheduled. The chapters are established on a metropolitan, state or regional basis, with each designed to fit the particular circumstances in regard to membership, geographical area and possibilities of chapter activities. At this time there are fourteen chapters organized. More than half the members are affiliated with these chapters and it is hoped that within the near future sufficient chapters will be organized so that every member of the Association will have the opportunity to participate in chapter activities.

Chapters of the Association are established in the New York-New Jersey metropolitan area as well as the Philadelphia, Chicago and New Orleans metropolitan areas. On the state basis there are chapters in Michigan, Minnesota, Alabama, Texas, Georgia and Utah, while on the regional basis we find the chap-

ters in the Ohio River Valley, the Upstate New York Chapter and the Northern and Southern California chapters.

Another feature of the Association is its broadening scope of membership which includes those engaged in public works other than municipal, county, state and federal officials. Feeling that there should be close cooperation between governmental agencies and business, utility and manufacturing groups in order that all public works, private and governmental, may be more closely coordinated the Association has in-

vited such people into the organization on an associate membership basis.

### An Invitation

All public works people, federal, state or local, appointed or elected, are cordially invited to study and investigate this organization, founded by and for those engaged in public works activities. Your questions are solicited. Address the American Public Works Association, 1313 E. 60th Street, Chicago 37, Illinois. We shall be happy to hear from you.



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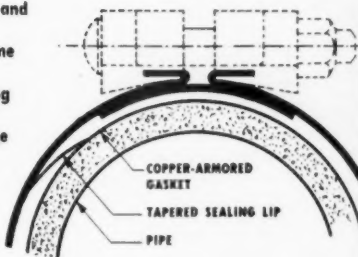


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## DIGESTS

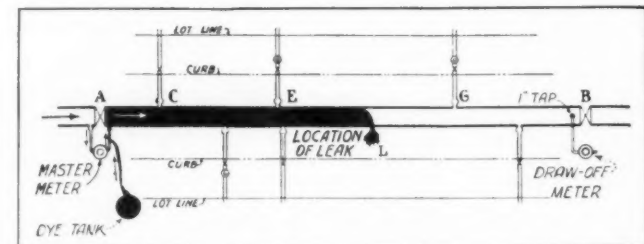
## THE WATER WORKS DIGEST

**Slow Sand  
Filters Still in Use**

For some reason, slow sand filters are considered by many to be antiquated and a relic of the past. Actually, 31 slow sand filters were in use in 1948 in New York State, as compared with 103 rapid sand filters. Experience over the years, since the first plant was constructed at Poughkeepsie, N. Y., in 1872, has definitely demonstrated that these filters are especially effective in the treatment of relatively clear surface waters, such as those in the northeasterly part of the country, as bacteria removal can be secured without pretreatment or without close technical supervision. These filters, therefore, are especially adapted to smaller supplies, secured from upland lakes and large reservoirs. On the other hand, the operation of these units is laborious where algae growths are prevalent, as with many relatively clear waters, and slow sand filters are soon clogged where iron and manganese are present to any significant extent.

Charles R. Cox—"Water-Supply Control in Retrospect," *Journal, New England Water Works Ass'n*, September.

Springfield, Mass., still uses 10 slow sand filters, covering 6 acres, 5 built in 1908 and 5 in 1925. Moreover it is now building 4 more, each covering a half-acre. They are especially suitable for Springfield's water, which contains color, some bacteria, but little turbidity. The old filters were designed for a rate of  $2\frac{1}{2}$  mgad, but have been operated at rates of 5 mgad, with occasional peaks of 7. The new filters are designed for 5 mgad normally, and the underdrains are designed for a rate of 15. The sand has an effective size of 0.25 to 0.35 with a maximum uniformity coefficient of 2.75; placed at depths of 38, 40, 42 and 44 inches, respectively. It is planned to remove 4 inches per year in cleaning, and



● Method of locating underground leaks by use of dyes.

Courtesy Water Works Engrs.

when only 18 inches is left, this will all be removed and washed and the filter rebuilt to 42-in. depth. Before being placed in the filters, sand is soaked for 24 hr. in water containing 100 ppm of chlorine.

Peter Karalekas — "Springfield, Mass., Builds 'High Rate' Slow Sand Filters," *American City*, September.

**Dye Method of  
Locating Underground Leaks**

Chicago, Ill., by its intensive program of locating and stopping leakage in its water mains, has to date stopped leakage of 330 mgd. It maintains an average of 8 engineering field parties in this work. Two methods of locating leaks are employed—by aquaphone or other sound-detecting device, and by the dye test. Use of the former is not very successful in city streets, where there are so many loud sounds due to traffic.

In the dye test, a section of main in which a leak is suspected is isolated by closing gate valves at the ends of the section and all of the service pipes. Previous to this a bypass containing a 1" or 2" meter is connected to the main around one of the valves to be closed, and a 1" tap and meter are connected just inside the other valve. (See sketch). When the valves A and B have been closed, a vegetable red dye (fuchsin) is injected into the main through the bypass. The volume of

water needed to fill the main from A to B is passed through the bypass to insure that all the water from A to the leak is dyed. The tap at B is then opened and water escapes from the main through the draw-off meter. When dyed water appears there, this meter is read, giving the amount of clear water between the leak and B; and, knowing the size of the main, the distance of the leak back from B can be calculated. Another method is to sample the water for color at the various service pipe connections; then the connections beyond the leak will show no dye, and the first of these will be just beyond the leak. Other ways of using dye are described in the article.

Justus B. Eddy—"Intensive Leakage Surveys Saved 330 MGD at Chicago, Ill.," *Water Works Engineering*, September.

**Waste Prevention  
In Edinburgh**

In order to reduce water waste, the city of Edinburgh (Scotland) attempts to limit the pressure on house plumbing fixtures to about 125 lb. To effect this in residences, only the two taps normally used for culinary and washing purposes are permitted to be connected directly to the main; others draw their supply from storage tanks. All taps supplied directly from the main have, at their inlet, an orifice plate containing a  $\frac{1}{4}$ -in. orifice. By zoning

the distribution system the pressure head in the mains is, so far as possible, limited to about 125 ft. Where the pressure exceeds this, pressure-reducing valves are installed. Tests have shown that, when pressures are reduced from about 200 ft. to 100 ft., there is a saving of about 5 gal. per capita per day; also there is a pronounced reduction in the wear and tear of fittings.

"Water Waste Prevention and Detection," *The Surveyor*, Sept. 13.

#### A New Method of Removing Radioactive Material

The author describes tests made of a proposed new method of removing radioactive material from water by slurring with powdered metal. The powdered metals evaluated included iron, aluminum, copper and zinc. There appeared to be an adsorption of radioactive materials on the surface of microscopic metallic particles. It was concluded that water contaminated with radioactive materials from an atomic bombing can be brought to safe tolerance level for emergency drinking purposes by a preliminary slurring with powdered metal, followed by conventional coagulation and filtration, provided the initial beta-gamma activity is not greater than  $10^{-2}$  microcuries. Of the metals tried, powdered iron appeared to give the best results.

William J. Lacy—"Removal of Radioactive Material from Water by Slurring With Powdered Metal," *Journal, American Water Works Ass'n*, September.

#### The Kansas Flood of 1951

The September issue of the *Journal of the American Water Works Ass'n* contains five papers describing effects of the Kansas flood of 1951, measures taken to minimize the damage and restore normal service, and ideas for preventing or reducing the recurrence of such floods. It was the greatest flood in quantity of water discharged and damage done by the Kansas river of which there is any record. Among the lessons learned was the effectiveness of requests to the public for cooperation. Lawrence officials broadcast an appeal for a 15% reduction in water use, and in a few hours the reservoirs, which had fallen very low, were full in spite of reduced pumping capacity. For emergency supplies, trailer-mounted purification units equipped with pressure

sand filters were superior for points that could be reached by highways. For sites that could be reached only by air, knocked-down, lightweight, diatomaceous earth filter units proved valuable. Two-way radio communication systems proved to be a vital factor. The value of good records of plants, valve locations, etc. was demonstrated. The desirability of arranging and training for mutual aid among neighboring cities was learned. There should be more general provision of reserve chemical feeding capacity.

In the matter of methods of pre-

venting future floods, Arthur E. Morgan presented the arguments for dams without gates for flood control, as provided in the Miami Conservancy Dist. Others discussed establishing emergency authority, notifying the public, shutting off the plant, emergency water supplies, and restoring service. Thirteen water and municipal officials and consulting engineers contributed to this discussion.

N. T. Veatch and others—"The Kansas Flood of 1951," *Journal, American Water Works Ass'n*, September.

#### FEATURES

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### Changing Location of Facilities Required by Highway Construction

When the improvement or creation of a street or highway necessitates relocating, raising, lowering, rebuilding or abandoning water mains or other facilities, who should pay the cost, which may be very considerable? The Washington Suburban Sanitary Com. is now spending an estimated \$32,600 for relocating utility structures in a highway project. Kansas City, Kan. paid more than \$33,000 for changes

in its water mains necessitated by one highway project. It seems unjust that water utilities, and consequently the consumers, should pay for changes which in no way benefit them. Several states have recognized the inequity of this. In New Jersey the State Highway Commission pays the cost. In California the cost is paid out of the state gasoline tax. Under a regulation of the Federal Bureau of Roads, 50% of such costs are paid out of federal funds. In some states the other 50% is paid by the state or city. An attorney, co-author of this paper, "submits

that inasmuch as the right which a state or city has given to a water company to utilize the streets for the laying of water mains to serve the inhabitants is a property right, in the nature of an easement, and that it amounts to a contract which cannot be impaired, there is no valid reason, in law, why a utility should be required to remove or relocate such mains at its expense."

Harry B. Shaw and G. H. Seig—"Relocation of Water Works Facilities in Highway Construction," *Journal, American Water Works Ass'n*, September.

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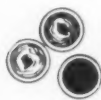
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Now, you don't need to replace clogged mains. Flexible Pipe Cleaning Company can clean that stuffed up main—return it to guaranteed 95% efficiency—and AT A FRACTION OF REPLACEMENT COST. For example, new 10" steel line, 30" under-

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### Determining Service Pipe Size

The water works superintendent should have some means for regulating and determining the size of the house pipe to be installed, based upon the available water pressure, the length of the house pipe, the number and type of plumbing fixtures installed, and the type of shutoff valve. In San Francisco an ordinance was passed in 1951, giving each plumbing fixture a relative value known as a fixture unit; stating that the minimum pressure satisfactory for fixtures is not less than 15 psi for flush valves; and not less than 8 psi for all other fixtures. With the data mentioned above known or ascertained, the correct size for a given building can be determined. If a consumer complains of poor pressure, the data relative to his service are obtained and studied to determine the cause, and the consumer informed by letter of the conclusion reached; and that, if the low pressure is due to the inadequacy of the service, this will be remedied at no expense to him.

S. Myron Tatarian—"Sizing of Services, Meters and House Piping," *Journal, American Water Works Ass'n*, September.

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## Turbidity and Odor Control

(Continued from page 61)

detention period of four hours. The sections are rectangular in shape, 35 feet wide by 70 feet long with a water depth of 10 feet 7 inches. Piping and sectionalizing valves are provided to pass the entire flow through one section of the basin when the other section is being cleaned. The basin is designed for vertical flow, downward from inlet distribution troughs and then upward to the effluent collection troughs. These troughs are made with v-notch weirs and are placed parallel to the long dimension of the basin.

Each basin compartment is provided with one distribution and two collection troughs which are adjustable in a vertical plane to insure proper distribution of the flow along the length of the troughs. The water is directed downward from the inlet trough and upward to the two collector troughs by a sloping baffle on each side of the distributor. These baffles are set at a 30 degree angle from the vertical and slope away from the distributor. This arrangement provides an increasing cross section area with a corresponding decrease in water velocity on its way down and under the baffle and a similar increasing cross section area and decreasing velocity as the water rises to the effluent

trough. According to the designing engineers this system of controlling the flow of water through the sedimentation basin accomplishes the following:

- (1) Provides for distribution of the water to the basin over a weir twice the length of the basin.
- (2) Decreases the velocity of the water through the basin, except as it passes under the baffle wall.
- (3) Collects the water from the basin over a weir length four times that of the basin.
- (4) Makes it possible to introduce water into the basin at top water level, distribute the flow over the entire length of the basin, reducing dead areas to a minimum, and to collect water along the entire length of the basin by a skimming action.

The bottom of the sedimentation basin is constructed with a false bottom of inverted pyramids in a manner similar to that of the mixing and flocculation basins. This arrangement allows periodic desludging of the sedimentation basin and when complete draining and cleaning of the basin is necessary it may be done by one man. Complete draining of the basin leaves only small patches of clinging sludge and dead algae on the walls and in the hoppers. This residue is easily

washed down and into the under-drain system by means of a water stream from a one-inch high pressure hose stream. As a matter of experience one half of the basin has been drained and cleaned, and refilling started, in one hour and twenty minutes.

### Filters and Controls

The four rapid sand filters have a capacity of 400 gallons per minute each. The 30-inch sand depth is supported by porous plate bottoms which are mounted on concrete piers. An overflow pipe is located in a corner of each filter, rather than in the sedimentation basin, to eliminate undesirable currents in the basin. Filters are backwashed by means of a wash water pump supplying water from the clear well at a rate to produce a 30-inch rise per minute. A fixed perforated wrought iron pipe system located immediately above the sand provides an adequate surface wash.

Instead of the conventional hydraulic rate of flow controllers each pair of filters is provided with a two-section white tile lined sight well. The outlet from each section is through a brass orifice plate and the level of water over the orifice is maintained by a Klipfel float valve in the filter effluent line which is actuated by the water level in an auxiliary float tank connected to the sight well. Each sight well is

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equipped with a vaporproof light and plate glass cover in an aluminum frame. The combination sight well and rate controller provides visual evidence of effluent quality; and since final adjustment of the float valves, a constant filter rate has been maintained. Each filter is equipped with Simplex loss of head gauges.

Filtered water is stored in a two-unit clear well having a total capacity of 255,000 gallons. Piping and sectionalizing valves allow separate or combined operation and inlets and outlets are arranged to prevent short circuiting.

A control center is located on the operating floor level. This cubical panel contains push button stations for all pumps and the following meters and gauges: (a) Indicating, integrating, and recording venturi meters on the filter effluent line and the high service discharge line; (b) clear well depth gauge; (c) wash water pressure gauge; (d) recording pressure gauge on high service discharge line; (e) indicating altitude and pressure gauge on high service discharge line; and (f) elevated tank altitude gauge.

Adequate laboratory facilities, operator's office, lavatory, shower and janitor's room are provided. Sample cocks for collecting water samples from various points in the treatment plant are conveniently located.

The plant was designed and construction was supervised by Howard K. Bell, consulting engineers of Lexington, Kentucky. The plant was constructed by G. E. Moore Company, Inc., of Greenwood, South Carolina. The cost of the plant, weir dam and intake works was \$424,648.26. The construction of main extensions and a 300,000-gallon elevated tank increased the total project cost to \$509,327.69. The constant speed drive for the quick mix was built by New England Tank and Tower Co.; the variable speed mixer, furnished by Walker Process Company, has a Reeves drive; the 300,000-gallon elevated storage tank was built by Chattanooga Boiler and Tank Company.

City officials and waterworks personnel of the city are justly proud of the new plant and system improvements. The highest possible compliment was inadvertently paid to the consulting engineers recently when the chief operator stated that after two years in the new plant he could not find a thing he would like to change.



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## Conservation

(Continued from page 58)

ized pipe and fittings above ground; iron instead of brass plugs for clean-outs; and various other alternates. These are but a few of the possible alternates that merit consideration, according to the Board's report.

On the assumption that new standards, or revisions of existing standards, might provide means of achieving conservation in building construction, the examination of standards and regulations was stipulated as an important part of the study to be made by BRAB. The Advisory Panel on Structural Engineering recommended that work be expedited on the revision of occupancy loads for buildings, and suggested an interim list of occupancy live loads. The Panel rejected proposals to increase working stresses in structural steel, but instead proposed certain live load reductions for specific live load/dead load ratios. It also enumerated a number of preferred national design standards for structural steel, reinforced concrete, steel joist construction, welding, stress-grade lumber, and masonry. The Advisory Panel on Plumbing recommended that the National Plumbing Code be designated as a manual of design for plumbing. It noted that a nationwide survey and private studies showed that savings might be effected by the use of the National Plumbing Code, as compared with certain local codes.

With reference to building codes, the Board noted that many old or specialized local codes contain restrictions preventing the general and uniform use of conservation measures. Some codes limit efforts for conservation to the extent to which they require more than the minimum generally accepted elsewhere.

Design, construction and maintenance practices profoundly affect the realization of conservation in the building field. Factors which must be present to achieve building conservation are enumerated by BRAB as: (1) modern standards and codes permitting the use of the most recent approved developments in building technology; (2) competence of the designer to choose and use the best and newest principles in his field; (3) design guides and manuals summarizing the knowledge of conservation measures in practice; (4) sufficient time for analysis and comparison,



development and use of the best design; and (5) coordination between the several technologies involved in the complex operation of modern building design, to achieve integration between the most efficient use of space, the structure, and the utilities within the space. The Board concludes that the most necessary ingredients for conservation in design are imagination and ingenuity.

### Professional Practices

With reference to Administrative and Professional Practices, the views of the Advisory Panel on Structural Engineering are particularly pertinent. The Panel noted that ingenuity in design is the most effective and productive of all conservation measures in engineering and architectural practice. Since competent engineering design is essential to the conservation of materials, time and money, the Panel recommended that "the selection of engineering firms be based on competence and not on competitive bids on the cost of engineering (a practice used by some municipal and local governments)." Other recommendations of the Panel included giving the engineer and architect latitude in design, adequate compensation therefor, and time sufficient for adequate engineering and architectural studies.

### Treated Timber

Among other ways of achieving conservation in engineering work is the use of treated timber. This practice saves in two ways: (1) the service life of timber structures is greatly extended, and (2) some of the less durable species of wood may be substituted (if treated) for the more durable species which would otherwise be required.

It is obvious that if treatment extends the useful life of timber by four or five times, as it does in the case of poles and railway ties, for instance, then the rate of consumption of wood is only one-fourth or one-fifth what it would be if untreated wood were used. Also, since species of wood which untreated have inferior resistance to decay or attack by insects may have fully adequate strength characteristics for the contemplated structure, the use of properly treated wood of these species reduces the drain on the supply of more durable species.

The use of treated timber for pole lines and foundation piles, and in

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harbor and waterfront structures, is a practice familiar to all engineers. Fence and guard rail posts, and planking are other common uses. The use of round timber in such applications as substation framing, and even in simple building frames, utilizes the full value of the wood and further reduces waste. Composite wood-concrete decking, in which the wood is employed as tension member, has been successfully used. With careful design, and if the quantity justifies it, timbers may be bored and incised before treatment, thus making preservation more effective. With a little ingenuity the engineer will find other instances in which conservation of wood by chemical treatment will effect savings of both money and materials.

Finally, the public works engineer has an important place in any nation-wide program of conservation, and conservation principles are destined more and more to become accepted practices in public as well as private organizations. In nearly all of the engineer's activities there are opportunities to save money, manpower, and materials. If he is "conservation conscious" and if he is kept informed of conservation progress in his own and related fields he is in a position to make highly important contributions to the national welfare.

• • •

**Garbage Grinder Installations  
in Los Angeles**

Manufacturers of home garbage grinders estimate that 125,000 have been installed in homes and restaurants of Los Angeles, Calif., and additional units are being installed at the rate of 10,000 a month. There are now several sections of the city virtually free of the garbage pail and garbage collection truck. Deputy County Engineer Arthur Pickett believes that these grinders provide an ideal solution to the garbage disposal problem; that the sewer system is the natural conveyor of garbage, and "elimination of garbage would raise our standard of living and benefit the public health, welfare and economy of every community." Indications are that 80% of the Los Angeles metropolitan area will be provided with garbage grinders by 1970. This will help greatly in solving that city's refuse disposal problem, although even then there will still be 650 tons of garbage a day to be collected.

## EQUIPMENT

Brief descriptions of new and more useful equipment for the Public Works field. For more details use coupon on page 28.

news

### If You Want to Get Rid of Those Leaves

This leaf loader works six times as fast as manual methods. It has a power unit, pickup and pulverizer, and a conveyor



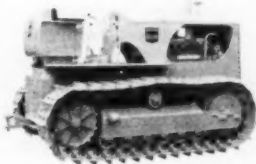
Wayne leaf pick-upper

which loads the leaves into an accompanying truck. It will handle leaves piled to 3 feet deep; and it will handle bottles, cans, sticks, small limbs, wet leaves and leaves frozen in ice or snow. The loader is towed by a truck or tractor. No special skills are necessary for operating this money-saving equipment. Illustrated booklet telling all about it from W. G. Wiley, Wayne Mfg. Co., Pomona, Calif.

Use coupon on page 28; circle No. 11-1

### New Heavy Tractor is Easy to Operate

The new OC-18 crawler tractor, just announced by Oliver, has 126 rated horsepower. Among the new features that make this tractor easy to operate are: air steering, which is standard equipment; electric starting by pushbutton; cold weather starting aid; two-man upholstered seat; parking brakes,



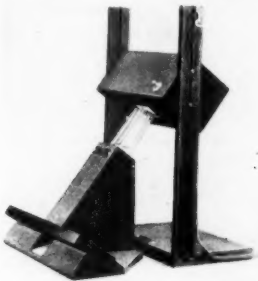
Oliver OC-18 tractor

center gear-shift lever; and ample leg room. More data from Oliver Corp., 19300 Euclid Ave., Cleveland 17, Ohio.

Use coupon on page 28; circle No. 11-2

### New Lamp Helps in Exact Water Analyses

A new lamp accessory has been developed for use with the Taylor water analyzing unit. This gives uniform daylight conditions at all times and permits analyses to be made at



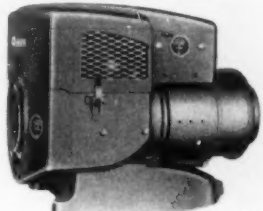
More exact analyses

night or under poor light conditions. Can be used with either long or short tubes, as shown in the accompanying illustration. Full data from W. A. Taylor & Co., 7304 York Road, Baltimore 4, Md., or by using the coupon.

Use coupon on page 28; circle No. 11-3

### Higher Capacity Small Electric Plant

Rated at 3500 watts, this new AC electric generating plant will work at 4000-watt over-



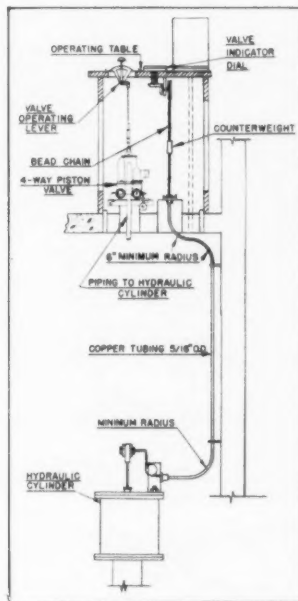
3500-watt AC generator

load for as much as 2 hours. Current is 115-volt, 60-cycle. Voltage regulation is plus or minus 3 per cent. The engine used on this unit is 4-cycle and it delivers its full rated load with a fuel consumption of 0.68 gal. per hour. Complete specifications on Form A-100-L. Write D. W. Onan & Sons Inc., Minneapolis 14, Minn.

Use coupon on page 28; circle No. 11-4

### New Valve Position Indicator for Filter Tables

This new valve position indicator-for use on filter operating tables is entirely mechanical



Valve position indicator

in its operation and requires no water, electrical or air connections. A bead chain, enclosed in a sheath of copper tubing, is used. It is claimed that this is corrosion-proof and cannot be damaged or knocked out of adjustment. Further information from Builders-Providence, Inc., 345 Harris Ave., Providence 1, R. I.

Use coupon on page 28; circle No. 11-5

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#### FOR SALE

City of Englewood, N. J. has eliminated a Pumping Station and has for sale:  
2—4" Fairbanks Morse 5 H.P. Motor Driven Trash Pump  
1—4" Fairbanks Morse 7½ H.P. Motor Driven Trash Pump  
1—5" Fairbanks Morse 15 H.P. Motor Driven Trash Pump

Later also Engine Drive

1 Each Fairbanks Morse Electric Motor Frame for 375 GPM, 700 GPM and 1200 GPM Pumps.

Various valves, connections, etc. in connection with above, also recording Venturi Tube Meter. List of items can be had upon application.

#### CITY OF ENGLEWOOD,

Municipal Bldg.,  
Englewood, N. J.

#### REPRESENTATIVES WANTED

Manufacturer's representatives wanted in Buffalo, Indianapolis, and Minneapolis areas for maker of liquid level controls of the floatless, electrode type. Address **CONTROLS** care **PUBLIC WORKS**. Replies will be forwarded but not acknowledged.

#### This Counter Tests the Qualities of Asphalt

A GE "scintillation counter" is an important part of a new test method to produce better highways with the aid of atomic radiation. Typical road stone is soaked in radioactive



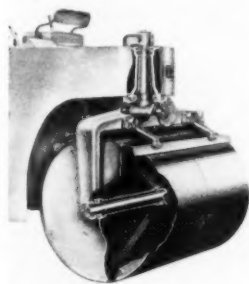
GE Scintillation counter

calcium chloride and dried. It is then coated evenly with asphalt, which may contain additives to improve adhesion characteristics; it is covered with water for a specific time. If the asphalt separates from the stone, the radioactive calcium chloride dissolves in the water, and the radiation of the residue is measured with this counter. From this, the quality and adhesive characteristics of the asphalt are determined. More information from General Electric Co., Schenectady 5, N. Y.

Use coupon on page 28; No. 11-6

#### New Series Tandem Rollers Announced by Huber

On these new Huber rollers, which are made in 8-12 and 10-14 ton sizes, two features are of particular advantage. For field servicing, all vital parts are readily accessible through adequate inspection plates and dust



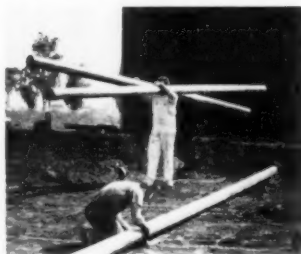
Huber yoke design

covers; the engine is also accessible from the rear; roll scrapers are hand adjustable; and all pressure grease fittings are within easy reach. A new yoke design is said to eliminate the "scuff" or rut on finish courses. The 8-12 ton roller has a compression of 278 pounds per lineal inch and the 10-14 ton roller has 326 pounds. There are many other interesting features which are described and illustrated fully in Bulletin T-152, which is available from Huber Mfg. Co., Marion, Ohio.

Use coupon on page 28; No. 11-7

#### Plastic Pipe for Water, Gas, Oil & Chemicals

Not affected by electrolytic corrosion, and of superior chemical resistance, this pipe is made of 100 per cent virgin plastic and is available in a full range of sizes from one-half inch to 6 inches diameter. A complete



Light weight plastic pipe

line of fittings is also made. The pipe is light in weight—one man can usually handle a length. More data from American Extruded Products Co., 1023 N. LaBrea Ave., Los Angeles 38, Calif.

Use coupon on page 28; No. 11-8

#### Porcelain Enamels Make Traffic Signs Last Longer

A special acid-resisting porcelain enamel has been developed for use on traffic control signs. Under the most severe atmospheric conditions, these signs are claimed to retain their brightness and color and to reduce overall costs. More from Porcelain Enamel Finishers, 3221 West 30th St., Chicago, Ill.

Use coupon on page 28; No. 11-9

#### Design Data on Plastic Pressure Pipe

This pipe is resistant to salts, acids and other corrosion agents; it withstands above or below ground service; the flow coefficient is high; it withstands temperatures from minus 90 to plus 230 F. It is light in weight, uses standard fittings, and requires simple tools only for laying. These and other advantages

are claimed by the makers. Standard sizes are 4, 6, 8 and 10-inch, OD, in 20-ft. lengths. Working pressure is 200 psi; burst pressure 1000 psi. For design information write Refin Co., PO Box 452, Gardena, Calif.

Use coupon on page 28; No. 11-10

### "Demon Snow Eater" for This Winter's Snow

This is another of those handy motorized snow removers for keeping walks, driveways, crosswalks, parking lots and other places free from that troublesome white stuff. It easily clears a swath 24 ins. wide in dry snow, 16 ins. in wet. And it blows the snow away. When the snow season is gone, the tractor serves as a portable power unit for pumping, sawing, generating and doing other jobs. Ask for data on the George Snow Blower, Communities Industries Ass'n., Sullivan, Ill.

Use coupon on page 28; No. 11-11

### Plastic Discs for Marking Traffic Lanes

These 3-inch diameter tapered plastic discs are feather-edged, tapering to a 1/4-inch high center. They are available in white or bright yellow and, when used as markers, are spaced about 24 ins. apart. The initial cost is low and installation is said to cost less than painting traffic lines. The plastic resists wear, oil, grease, hydrocarbons, etc. Data from Campro Sales Co., Industrial Products Division, 1300 Fourth St. SW, Canton, Ohio.

Use coupon on page 28; No. 11-12

### New Screen for Dewatering Fine Materials

This new "wedge-slot" screen is made with very small stainless steel bars which have a V-shape profile that is effective for dewatering, drying, filtering, wet-screening and centrifuging. Type 10A bars are used for openings ranging from 0.004 inch to 0.04 inch; and Type 15A bars are used for openings from 0.012 inch to 0.06 inch. Fuller information from Hendricks Mfg. Co., Carbon-dale, Pa.

Use coupon on page 28; No. 11-13

### Time-Saving Devices on New Small Concrete Mixer

A new model 3 1/2-S tilting concrete mixer incorporates features that save time and work. Faster mixing cycles are provided by new-type mixing blades; tilting is accomplished with minimum effort through a reduction gear arrangement; the drum can be stopped and held in any position. A 4-page catalog gives all the details. Kwik-Mix Co., Port Washington, Wisc.

Use coupon on page 28; No. 11-14

### Feeding Garbage to Hogs Spreads New Disease

Vesicular exanthema, a serious disease affecting hogs, recently has become quite widespread in the United States. As a result, the Army, which is one of the worst offenders in respect to feeding garbage to hogs, has directed that all uncooked fresh pork scraps and trimmings shall be incinerated or otherwise disposed of so as to insure that they will not be fed to pigs. It is believed that Boards of Health will follow this lead and it is hoped they will take long-needed steps to control this highly unsanitary method of garbage disposal.



### Floodproof Outfall Sewer Structure

The outfall for a storm sewer in Middletown, Ohio, was protected against flood damage by a method that saved several thousand dollars. The last 32 ft. of 102-inch Armo asbestos bonded sewer pipe was placed inside a 120-inch multi-plate pipe and the annular space between the two pipes was filled with concrete. This double pipe section was attached to two concrete saddles shaped to fit the bottom third of the outer pipe, the saddles being located 8 ft. from each end of the 32-ft. section.

## ASSOCIATIONS

The Fifth Annual Illinois Traffic Engineering Conference will be held at the University of Illinois, Urbana, Ill., Dec. 11 and 12. Inquiries regarding additional information should be sent to R. K. Newton, Supervisor, Engineering Extension, 713 1/2 So. Wright St., Champaign, Ill.

## PERSONAL NEWS

Camp, Dresser & McKee, consulting engineers of Boston, Mass., have expanded the partnership to include three associates. In addition to Thomas R. Camp and Herman G. Dresser, the firm now includes Roland S. Burlingame, Joseph C. Lawler and Darrell A. Root. All of these men have had wide engineering experience.

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## to WATER WORKS and SEWAGE MEN

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"The Use of Copper Sulphate in Control of Microscopic Organisms" by Dr. Frank E. Hale (former Director of Laboratories, Dept. of Water Supply, City of New York) is an authoritative work concerning the control of micro-organisms and elimination of tastes and odors. Describes in detail methods of controlling various forms of micro-ecopic life commonly encountered in water supply systems. Contains descriptive material, plus 48 photo-micrograph studies of organisms discussed.

# ROOT AND FUNGUS CONTROL



"Copper Sulphate for Root and Fungus Control in Sanitary Sewers and Storm Drains," by John W. Hood, contains information published for the first time. This material includes actual methods for control and operating procedure. Here's the book that is a "must" for all sewage men.

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Name \_\_\_\_\_ Title \_\_\_\_\_

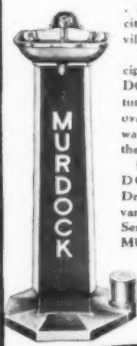
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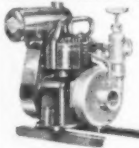
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Curtis J. Hooper has joined the consulting engineering firm of Parsons, Brinckerhoff, Hall and MacDonald as an associate. He will be in charge of the Traffic and Planning Division. For the past nineteen years, Mr. Hooper has been with the Connecticut Highway Department.

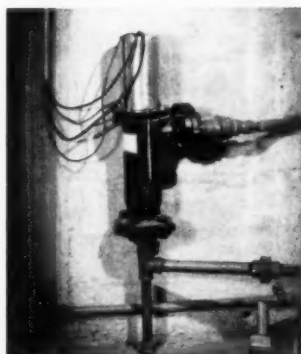
Prof. Leo J. Ritter, Jr., has joined the faculty of New York University's College of Engineering as Associate Professor of Transportation Engineering. In this capacity, he will conduct courses in highway engineering and in soil mechanics.

Raymond C. Carlson has been made a partner of the consulting firm of St. John & Platt and will be in charge of a new office which has been opened at 627 Genesee Blvd., Buffalo 2, N. Y.

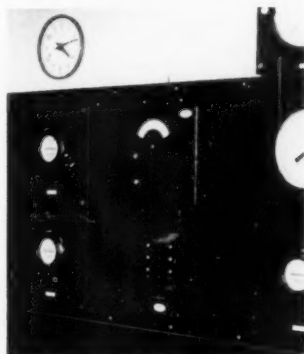
#### Jobs for Engineers

There are vacancies for civil, mechanical and construction engineers with the Veterans Administration. The beginning salary is \$3410 per year. Applications should be sent to Personnel Officer, Veterans Administration, Washington 25, D. C.

## Accurate pH Control Aids in Better Water Treatment



● Flow assembly where pH readings are taken and corrected



● Central control panel room with pH indicator

**P**OOPLY buffered water is obtained by the city of Long Beach, Calif., from 30 artesian wells. Color and taste are the primary problems in treatment, which consists of chlorination, coagulation with ferric chloride and the use of activated carbon. The addition of the chlorine depresses the pH which must be raised subsequently to permit efficient coagulation with ferric chloride. Because the water is poorly buffered, it is difficult to maintain the accurate pH control required for efficient operation.

This difficulty has been solved by the use of a Beckman Model R pH indicator. This is mounted on a panel in the central control room and electrode sets are placed to provide readings directly to the control panel from the following points:

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pH correction. An immediate check of pH at any of these points may be obtained by pushing the appropriate button on the control panel. Frequent readings are taken by the operator and deviations from the desired pH are noted. Corrections are then made in the dosages of the treatment chemicals before treatment efficiency is impaired.

This automatic equipment eliminates the need for frequent or continual grab sampling for pH measurements; it provides immediate pH readings at four vital points in the treatment process; it saves substantially in the amounts of chemicals required; and it enables the production of a treated water of more uniform and satisfactory characteristics.

With this equipment, a continuous record of pH can be made and this unit can operate a controller which will regulate the amount of chemicals added to the water.

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The Flink "POWER-MATIC"—Model HD41 (shown above)—is ideal for ice control, dust control, road building and maintenance. Fits all dump trucks as a replacement tail gate. Does not limit use of truck to spreading. Spreads full or half width, forward or backward. Safe to use in traffic. Controls from cab. Hydraulic or chain-drive models available. Flink's better control, and faster spreading with less waste of material are the results of 14 years of building and developing automatic spreaders.

Model 55

**FLINK  
"Pull-Type"  
SPREADERS**



A new improved Spreader for sand, cinders and all other granular materials used for ice or dust control and seal coating. Large hopper for easy charging. Widely used by military airports.

*Write for Literature and the Name  
of Your Nearest Distributor*

**THE  
Flink co.**  
Dept. 1300  
**STREATOR, ILLINOIS**

## Worth Telling

by Arthur K. Akers



★ **HERE'S WILLIAM H. STEINKAMP**, new vice president and general sales manager of **BECKMAN INSTRUMENTS**, South Pasadena, Calif., once general sales manager of Brown Instruments division, **MINNEAPOLIS HONEYWELL REGULATOR CO.**, Philadelphia.



Mr. Steinkamp



Mr. Chapman

★ **CATERPILLAR TRACTOR** news includes a big new warehouse and parts processing plant at York, Pa.; and appointment of **E. C. CHAPMAN**, as assistant sales manager for the northern portion of its eastern sales division.

★ **MARLOW PUMPS**, of Ridgewood, N. J., has just "cracked" the Portuguese fire-fighting front with a self-priming centrifugal pump, duly blessed by an Archbishop. Would that we had space to show the fire truck with the fine-feathered Lisbon firemen clustered about it.

★ **CATAPHOTE CORPORATION**, Toledo, Ohio, and Jackson, Miss., announces the **G. D. BAVIN COMPANY**, Los Angeles 5, as its new representatives in the inter-mountain states and southern California.

★ **E. W. ERVASTI** becomes manager, industrial sales, **WOLVERINE TUBE DIVISION**, Detroit.

★ **LOCK JOINT PIPE COMPANY** gets a new 3-story addition to its general office building in East Orange, N. J. for use as engineering administration offices, air-conditioned, fluorescent lighted, and everything.

★ **INTERNATIONAL HARVESTER** has just opened its new \$8,000,000 motor truck engineering building in Fort Wayne, Ind.

★ **NEWEST** industrial de-centralization note: **YEOMANS BROTHERS COMPANY** has moved out of the Chicago Loop, to Melrose Park, Ill.

★ **ROBERT L. HOLT** is appointed vice president of **BOWSER, INC.**, Fort Wayne, Ind.

★ **CHRYSLER INDUSTRIAL ENGINE DIVISION** is now in its new Trenton, Mich., plant. This signalizes their further expansion in the industrial power field.

★ **AT MUELLER COMPANY**, Decatur, Ill., **ROBERT H. MORRIS** is now general sales vice president; **ROBERT K. LEVEY** his assistant; and **ROBERT P. JETT** director of sales planning.

★ **WESTINGHOUSE AIR BRAKE COMPANY** has purchased a majority interest in **LE ROI COMPANY**, manufacturers of engines, portable compressors, etc. in Milwaukee.

★ **IF YOU SEE** this trailer rolling along your streets, you will be welcome inside to see % **PROPORTIONEERS'** % latest equipment for fluoridation and



Inside that trailer.

hypochlorination of water. Some very interesting liquids used to come out of the "little red pumps" of its predecessor; but we wouldn't know about that now!

★ **IN THIS** great land of opportunity a man can start out digging ditches or laying brick, and wind up behind a fine big desk—providing of course he doesn't mind the financial sacrifice.

—Universal Concrete PIPE DREAMS.

# LOCK JOINT



...in the heart of the  
**GREAT LAKES REGION**

## **SERVICE TO THE HIGHLY INDUSTRIALIZED GREAT LAKES REGION**

is the main purpose of Lock Joint's permanent manufacturing plant on the outskirts of Detroit. Specializing in pipe 24" in diameter and larger for water supply lines, distribution feeder mains, cooling water or process water lines, subaqueous intakes and outfalls, the Detroit plant is ideally situated to serve such nearby industrial centers as Chicago, Cleveland, Gary, Akron and Toledo. Because of this convenient location, pipe from the Detroit plant can be economically shipped to other parts of the country, as well.

*AUGMENTING THE DETROIT OPERATION* are our three other modern permanent pipe manufacturing plants. Each of these plants is strategically located to serve the rest of the country East of the Rockies. The Wharton, N. J., plant covers the East; Columbia, S. C., the South; and Turner, Kansas, the Great Plains. No matter how large or small your contracts may be, if your pipe requirements are 16" in diameter or larger, you can rest assured that the efficient and economical answer to your pipe problem can be supplied from one of these four Lock Joint Plants.

SCOPE OF SERVICES—Lock Joint Pipe Company specializes in the manufacture and installation of Reinforced Concrete Pressure Pipe for Water Supply and Distribution Mains in a wide range of diameters as well as Concrete Pipes of all types for Sanitary Sewers, Storm Drains, Culverts and Subaqueous Lines.

### **LOCK JOINT PIPE COMPANY**

*Established 1905*

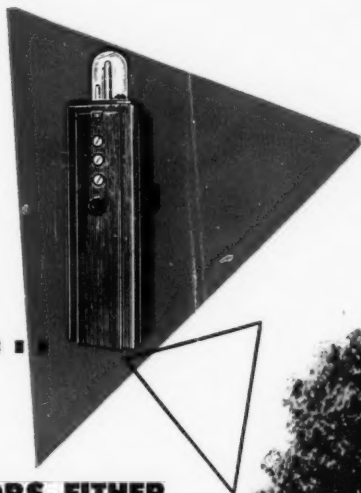
**P. O. Box 269, East Orange, N. J.**

**PRESSURE PIPE PLANTS:** Wharton, N. J., Turner, Kan.,  
Detroit, Mich., Columbia, S. C.

**BRANCH OFFICES:** Casper, Wyo. • Cheyenne, Wyo. • Denver, Col. • Kansas City, Mo. • Valley Park, Mo. • Chicago, Ill. • Rock Island, Ill. • Wichita, Kan. • Kenilworth, N. J. • Hartford, Conn. • Tucuman, N. Mex. • Oklahoma City, Okla. • Tulsa, Okla. • Beloit, Wis. • Hato Rey, P. R. • Caracas, Venezuela

**LOCK JOINT**  
*Reinforced Concrete*  
**PRESSURE PIPE**

# THE ROOTS DON'T SHOW.....



## IN W & T CHLORINATORS, EITHER

The unseen roots of a beautiful tree give it life and strength. So, too, do the unseen features back of a W&T Chlorinator—basic research, service, and a complete line of equipment—ensure dependability and trouble-free operation throughout the years.

Basis research, for example, while not necessarily essential to each particular installation, is, nevertheless, the life blood of sound equipment. W&T research developed the Visible Vacuum Principle, residual recording, the Break-Point Process and countless other advances in the art of chlorination. This same research is constantly at work to insure that the W&T Equipment you buy is up-to-date in every respect and will not be outmoded before its time.

The desire for that assurance may be another reason for the ever growing demand for W&T Chlorinators.



## WALLACE & TIERNAN COMPANY, INC.

CHLORINE AND CHEMICAL CONTROL EQUIPMENT  
NEWARK 1, NEW JERSEY • REPRESENTED IN PRINCIPAL CITIES

The Roots Of New Water Treatment  
Techniques Often Lie In W&T Research

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